

No. \_\_\_\_\_

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**In the Supreme Court of the United States**

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STEEL INSTITUTE OF NEW YORK,  
*Petitioner,*

v.

CITY OF NEW YORK,  
*Respondent.*

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*On Petition for Writ of Certiorari  
to the United States Court of Appeals  
for the Second Circuit*

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**VOLUME 2 OF APPENDIX TO  
PETITION FOR WRIT OF CERTIORARI**

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**APPENDIX**

**TABLE OF CONTENTS**

**VOLUME 1**

Appendix A:	Opinion and Judgment in the United States Court of Appeals for the Second Circuit (May 7, 2013) . . . . .	App. 1
Appendix B:	Memorandum Decision and Order and Judgment in the United States District Court for the Southern District of New York (December 21, 2011) . . . . .	App. 24
Appendix C:	Oral Argument Transcript in the United States Court of Appeals for the Second Circuit Excerpt (December 20, 2012) . . . . .	App. 81

**VOLUME 2**

Appendix D:	29 CFR § 1926 Subpart CC . . . . .	App. 84
Appendix E:	29 U.S.C. § 667 . . . . .	App. 325
Appendix F:	NYC Admin. Code § 3316.1 . . . . .	App. 331

Appendix G:	NYC Admin. Code § 3319.1 . . . . .	App. 335
Appendix H:	NYC Building Code Reference Standard RS 19-2 . . . . .	App. 350
Appendix I:	Order on Motions for Summary Judgment in the United States District Court for the Southern District of Florida in <i>Associated Builders and Contractors Florida East Coast Chapter v. Miami- Dade County</i> (unpublished) (January 14, 2009) . . . . .	App. 416

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**APPENDIX D**

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**Subpart CC—Cranes and Derricks in  
Construction**

**§ 1926.1400 Scope.**

(a) This standard applies to power-operated equipment, when used in construction, that can hoist, lower and horizontally move a suspended load. Such equipment includes, but is not limited to: articulating cranes (such as knuckle-boom cranes); crawler cranes; floating cranes; cranes on barges; locomotive cranes; mobile cranes (such as wheel-mounted, rough-terrain, all-terrain, commercial truck-mounted, and boom truck cranes); multi-purpose machines when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load; industrial cranes (such as carry-deck cranes); dedicated pile drivers; service/mechanic trucks with a hoisting device; a crane on a monorail; tower cranes (such as a fixed jib, i.e., “hammerhead boom”), luffing boom and self-erecting; pedestal cranes; portal cranes; overhead and gantry cranes; straddle cranes; sideboom cranes; derricks; and variations of such equipment. However, items listed in paragraph (c) of this section are excluded from the scope of this standard.

(b) Attachments. This standard applies to equipment included in paragraph (a) of this section when used with attachments. Such attachments, whether crane-attached or suspended include, but are

App. 85

not limited to: hooks, magnets, grapples, clamshell buckets, orange peel buckets, concrete buckets, drag lines, personnel platforms, augers or drills and pile driving equipment.

(c) Exclusions. This subpart does not cover:

(1) Machinery included in paragraph (a) of this section while it has been converted or adapted for a non-hoisting/lifting use. Such conversions/adaptations include, but are not limited to, power shovels, excavators and concrete pumps.

(2) Power shovels, excavators, wheel loaders, backhoes, loader backhoes, track loaders. This machinery is also excluded when used with chains, slings or other rigging to lift suspended loads.

(3) Automotive wreckers and tow trucks when used to clear wrecks and haul vehicles.

(4) Digger derricks when used for augering holes for poles carrying electric and telecommunication lines, placing and removing the poles, and for handling associated materials to be installed on or removed from the poles. Digger derricks used in work subject to 29 CFR part 1926, subpart V, must comply with 29 CFR 1910.269. Digger derricks used in construction work for telecommunication service (as defined at 29 CFR 1910.268(s)(40)) must comply with 29 CFR 1910.268.

App. 86

- (5) Machinery originally designed as vehicle-mounted aerial devices (for lifting personnel) and self-propelled elevating work platforms.
- (6) Telescopic/hydraulic gantry systems.
- (7) Stacker cranes.
- (8) Powered industrial trucks (forklifts), except when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load.
- (9) Mechanic's truck with a hoisting device when used in activities related to equipment maintenance and repair.
- (10) Machinery that hoists by using a come-a-long or chainfall.
- (11) Dedicated drilling rigs.
- (12) Gin poles when used for the erection of communication towers.
- (13) Tree trimming and tree removal work.
- (14) Anchor handling or dredge-related operations with a vessel or barge using an affixed A-frame.
- (15) Roustabouts.
- (16) Helicopter cranes.

(17) Material Delivery

(i) Articulating/knuckle-boom truck cranes that deliver material to a construction site when used to transfer materials from the truck crane to the ground, without arranging the materials in a particular sequence for hoisting.

(ii) Articulating/knuckle-boom truck cranes that deliver material to a construction site when the crane is used to transfer building supply sheet goods or building supply packaged materials from the truck crane onto a structure, using a fork/cradle at the end of the boom, but only when the truck crane is equipped with a properly functioning automatic overload prevention device. Such sheet goods or packaged materials include, but are not limited to: sheets of sheet rock, sheets of plywood, bags of cement, sheets or packages of roofing shingles, and rolls of roofing felt.

(iii) This exclusion does not apply when:

(A) The articulating/knuckle-boom crane is used to hold, support or stabilize the material to facilitate a construction activity, such as holding material in place while it is attached to the structure;

App. 88

(B) The material being handled by the articulating/knuckle-boom crane is a prefabricated component. Such prefabricated components include, but are not limited to: precast concrete members or panels, roof trusses (wooden, cold-formed metal, steel, or other material), prefabricated building sections such as, but not limited to: floor panels, wall panels, roof panels, roof structures, or similar items;

(C) The material being handled by the crane is a structural steel member (for example, steel joists, beams, columns, steel decking (bundled or unbundled) or a component of a systems-engineered metal building (as defined in 29 CFR 1926 subpart R).

(D) The activity is not specifically excluded under §1400(c)(17)(i) and (ii).

(d) All sections of this subpart CC apply to the equipment covered by this standard unless specified otherwise.

(e) The duties of controlling entities under this subpart include, but are not limited to, the duties specified in § 1926.1402(c), § 1926.1402(e) and § 1926.1424(b).

(f) Where provisions of this standard direct an operator, crew member, or other employee to take certain actions, the employer must establish, effectively



communicate to the relevant persons, and enforce, work rules to ensure compliance with such provisions.

(g) For work covered by subpart V of this part, compliance with 29 CFR § 1910.269(p) is deemed compliance with §§ 1926.1407 through 1926.1411.

(h) Section 1926.1402 does not apply to cranes designed for use on railroad tracks, when used on railroad tracks that are part of the general railroad system of transportation that is regulated pursuant to the Federal Railroad Administration under 49 CFR part 213, and that comply with applicable Federal Railroad Administration requirements. See § 1926.1402(f).

**§ 1926.1401 Definitions.**

*A/D director (Assembly/Disassembly director)* means an individual who meets this subpart's requirements for an A/D director, irrespective of the person's formal job title or whether the person is non-management or management personnel.

*Articulating crane* means a crane whose boom consists of a series of folding, pin connected structural members, typically manipulated to extend or retract by power from hydraulic cylinders.

*Assembly/Disassembly* means the assembly and/or disassembly of equipment covered under this standard. With regard to tower cranes, "erecting and climbing" replaces the term "assembly," and "dismantling" replaces the term "disassembly." Regardless of whether the crane is initially erected to its full height or is

## App. 90

climbed in stages, the process of increasing the height of the crane is an erection process.

Assist crane means a crane used to assist in assembling or disassembling a crane.

Attachments means any device that expands the range of tasks that can be done by the equipment. Examples include, but are not limited to: an auger, drill, magnet, pile-driver, and boom-attached personnel platform.

Audible signal means a signal made by a distinct sound or series of sounds. Examples include, but are not limited to, sounds made by a bell, horn, or whistle.

Blocking (also referred to as “cribbing”) is wood or other material used to support equipment or a component and distribute loads to the ground. It is typically used to support lattice boom sections during assembly/disassembly and under outrigger and stabilizer floats.

Boatswain’s chair means a single-point adjustable suspension scaffold consisting of a seat or sling (which may be incorporated into a full body harness) designed to support one employee in a sitting position.

Bogie means “travel bogie,” which is defined below.

Boom (equipment other than tower crane) means an inclined spar, strut, or other long structural member which supports the upper hoisting tackle on a crane or derrick. Typically, the length and vertical angle of the boom can be varied to achieve increased height or height and reach when lifting loads. Booms can usually be grouped into general categories of hydraulically

## App. 91

extendible, cantilevered type, latticed section, cable supported type or articulating type.

Boom (tower cranes): On tower cranes, if the “boom” (i.e., principal horizontal structure) is fixed, it is referred to as a jib; if it is moveable up and down, it is referred to as a boom.

Boom angle indicator means a device which measures the angle of the boom relative to horizontal.

Boom hoist limiting device includes boom hoist disengaging device, boom hoist shutoff, boom hoist disconnect, boom hoist hydraulic relief, boom hoist kick-outs, automatic boom stop device, or derricking limiter. This type of device disengages boom hoist power when the boom reaches a predetermined operating angle. It also sets brakes or closes valves to prevent the boom from lowering after power is disengaged.

Boom length indicator indicates the length of the permanent part of the boom (such as ruled markings on the boom) or, as in some computerized systems, the length of the boom with extensions/attachments.

Boom stop includes boom stops, (belly straps with struts/standoff), telescoping boom stops, attachment boom stops, and backstops. These devices restrict the boom from moving above a certain maximum angle and toppling over backward.

Boom suspension system means a system of pendants, running ropes, sheaves, and other hardware which supports the boom tip and controls the boom angle.

App. 92

Builder means the builder/constructor of equipment.

Center of gravity: The center of gravity of any object is the point in the object around which its weight is evenly distributed. If you could put a support under that point, you could balance the object on the support.

Certified welder means a welder who meets nationally recognized certification requirements applicable to the task being performed.

Climbing means the process in which a tower crane is raised to a new working height, either by adding additional tower sections to the top of the crane (top climbing), or by a system in which the entire crane is raised inside the structure (inside climbing).

Come-a-long means a mechanical device typically consisting of a chain or cable attached at each end that is used to facilitate movement of materials through leverage.

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Controlled load lowering means lowering a load by means of a mechanical hoist drum device that allows a hoisted load to be lowered with maximum control using the gear train or hydraulic components of the hoist mechanism. Controlled load lowering requires the use

App. 93

of the hoist drive motor, rather than the load hoist brake, to lower the load.

Controlling entity means an employer that is a prime contractor, general contractor, construction manager or any other legal entity which has the overall responsibility for the construction of the project – its planning, quality and completion.

Counterweight means a weight used to supplement the weight of equipment in providing stability for lifting loads by counterbalancing those loads.

Crane/derrick includes all equipment covered by this subpart.

Crawler crane means equipment that has a type of base mounting which incorporates a continuous belt of sprocket driven track.

Crossover points means locations on a wire rope which is spooled on a drum where one layer of rope climbs up on and crosses over the previous layer. This takes place at each flange of the drum as the rope is spooled onto the drum, reaches the flange, and begins to wrap back in the opposite direction.

Dedicated channel means a line of communication assigned by the employer who controls the communication system to only one signal person and crane/derrick or to a coordinated group of cranes/derricks/signal person(s).

Dedicated pile-driver is a machine that is designed to function exclusively as a pile-driver. These machines

App. 94

typically have the ability to both hoist the material that will be pile-driven and to pile-drive that material.

Dedicated spotter (power lines): To be considered a dedicated spotter, the requirements of § 1926.1428 (Signal person qualifications) must be met and his/her sole responsibility is to watch the separation between the power line and: the equipment, load line and load (including rigging and lifting accessories), and ensure through communication with the operator that the applicable minimum approach distance is not breached.

Directly under the load means a part or all of an employee is directly beneath the load.

Dismantling includes partial dismantling (such as dismantling to shorten a boom or substitute a different component).

Drum rotation indicator means a device on a crane or hoist which indicates in which direction and at what relative speed a particular hoist drum is turning.

Electrical contact occurs when a person, object, or equipment makes contact or comes in close proximity with an energized conductor or equipment that allows the passage of current.

Employer-made equipment means floating cranes/derricks designed and built by an employer for the employer's own use.

Encroachment is where any part of the crane, load line or load (including rigging and lifting accessories)

App. 95

breaches a minimum clearance distance that this subpart requires to be maintained from a power line.

Equipment means equipment covered by this subpart.

Equipment criteria means instructions, recommendations, limitations and specifications.

Fall protection equipment means guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems.

Fall restraint system means a fall protection system that prevents the user from falling any distance. The system is comprised of either a body belt or body harness, along with an anchorage, connectors and other necessary equipment. The other components typically include a lanyard, and may also include a lifeline and other devices.

Fall zone means the area (including but not limited to the area directly beneath the load) in which it is reasonably foreseeable that partially or completely suspended materials could fall in the event of an accident.

Flange points are points of contact between rope and drum flange where the rope changes layers.

Floating cranes / derricks means equipment designed by the manufacturer (or employer) for marine use by permanent attachment to a barge, pontoons, vessel or other means of flotation.

App. 96

For example means “one example, although there are others.”

Free fall (of the load line) means that only the brake is used to regulate the descent of the load line (the drive mechanism is not used to drive the load down faster or retard its lowering).

Free surface effect is the uncontrolled transverse movement of liquids in compartments which reduce a vessel's transverse stability.

Hoist means a mechanical device for lifting and lowering loads by winding a line onto or off a drum.

Hoisting is the act of raising, lowering or otherwise moving a load in the air with equipment covered by this standard. As used in this standard, “hoisting” can be done by means other than wire rope/ hoist drum equipment.

Include/including means “including, but not limited to.”

Insulating link/device means an insulating device listed, labeled, or accepted by a Nationally Recognized Testing Laboratory in accordance with 29 CFR 1910.7.

Jib stop (also referred to as a jib backstop), is the same type of device as a boom stop but is for a fixed or luffing jib.

Land crane/derrick is equipment not originally designed by the manufacturer for marine use by



## App. 97

permanent attachment to barges, pontoons, vessels, or other means of floatation.

List means the angle of inclination about the longitudinal axis of a barge, pontoons, vessel or other means of floatation.

Load refers to the object(s) being hoisted and/or the weight of the object(s); both uses refer to the object(s) and the load-attaching equipment, such as, the load block, ropes, slings, shackles, and any other ancillary attachment.

Load moment (or rated capacity) indicator means a system which aids the equipment operator by sensing (directly or indirectly) the overturning moment on the equipment, i.e., load multiplied by radius. It compares this lifting condition to the equipment's rated capacity, and indicates to the operator the percentage of capacity at which the equipment is working. Lights, bells, or buzzers may be incorporated as a warning of an approaching overload condition.

Load moment (or rated capacity) limiter means a system which aids the equipment operator by sensing (directly or indirectly) the overturning moment on the equipment, i.e., load multiplied by radius. It compares this lifting condition to the equipment's rated capacity, and when the rated capacity is reached, it shuts off power to those equipment functions which can increase the severity of loading on the equipment, e.g., hoisting, telescoping out, or luffing out. Typically, those functions which decrease the severity of loading on the equipment remain operational, e.g., lowering, telescoping in, or luffing in.

App. 98

Locomotive crane means a crane mounted on a base or car equipped for travel on a railroad track.

Luffing jib limiting device is similar to a boom hoist limiting device, except that it limits the movement of the luffing jib.

Marine hoisted personnel transfer device means a device, such as a “transfer net,” that is designed to protect the employees being hoisted during a marine transfer and to facilitate rapid entry into and exit from the device. Such devices do not include boatswain’s chairs when hoisted by equipment covered by this standard.

Marine worksite means a construction worksite located in, on or above the water.

Mobile crane means a lifting device incorporating a cable suspended latticed boom or hydraulic telescopic boom designed to be moved between operating locations by transport over the road.

Moving point-to-point means the times during which an employee is in the process of going to or from a work station.

Multi-purpose machine means a machine that is designed to be configured in various ways, at least one of which allows it to hoist (by means of a winch or hook) and horizontally move a suspended load. For example, a machine that can rotate and can be configured with removable forks/tongs (for use as a forklift) or with a winch pack, jib (with a hook at the end) or jib used in conjunction with a winch. When

## App. 99

configured with the forks/tongs, it is not covered by this subpart. When configured with a winch pack, jib (with a hook at the end) or jib used in conjunction with a winch, it is covered by this subpart.

Nationally recognized accrediting agency is an organization that, due to its independence and expertise, is widely recognized as competent to accredit testing organizations. Examples of such accrediting agencies include, but are not limited to, the National Commission for Certifying Agencies and the American National Standards Institute

Nonconductive means that, because of the nature and condition of the materials used, and the conditions of use (including environmental conditions and condition of the material), the object in question has the property of not becoming energized (that is, it has high dielectric properties offering a high resistance to the passage of current under the conditions of use).

Operational aids are devices that assist the operator in the safe operation of the crane by providing information or automatically taking control of a crane function. These include, but are not limited to, the devices listed in § 1926.1416 (“listed operational aids”).

Operational controls means levers, switches, pedals and other devices for controlling equipment operation.

Operator means a person who is operating the equipment.

Overhead and gantry cranes includes overhead/bridge cranes, semigantry, cantilever gantry, wall cranes,

## App. 100

storage bridge cranes, launching gantry cranes, and similar equipment, irrespective of whether it travels on tracks, wheels, or other means.

Paragraph refers to a paragraph in the same section of this subpart that the word “paragraph” is used, unless otherwise specified.

Pendants includes both wire and bar types. Wire type: a fixed length of wire rope with mechanical fittings at both ends for pinning segments of wire rope together. Bar type: instead of wire rope, a bar is used. Pendants are typically used in a latticed boom crane system to easily change the length of the boom suspension system without completely changing the rope on the drum when the boom length is increased or decreased.

Personal fall arrest system means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or suitable combination of these.

Portal crane is a type of crane consisting of a rotating upperstructure, hoist machinery, and boom mounted on top of a structural gantry which may be fixed in one location or have travel capability. The gantry legs or columns usually have portal openings in between to allow passage of traffic beneath the gantry.

Power lines means electric transmission and distribution lines.

App. 101

Procedures include, but are not limited to: instructions, diagrams, recommendations, warnings, specifications, protocols and limitations.

Proximity alarm is a device that provides a warning of proximity to a power line and that has been listed, labeled, or accepted by a Nationally Recognized Testing Laboratory in accordance with 29 CFR 1910.7.

Qualified evaluator (not a third party) means a person employed by the signal person's employer who has demonstrated that he/she is competent in accurately assessing whether individuals meet the Qualification Requirements in this subpart for a signal person.

Qualified evaluator (third party) means an entity that, due to its independence and expertise, has demonstrated that it is competent in accurately assessing whether individuals meet the Qualification Requirements in this subpart for a signal person.

Qualified person means a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.

Qualified rigger is a rigger who meets the criteria for a qualified person.

Range control limit device is a device that can be set by an equipment operator to limit movement of the boom or jib tip to a plane or multiple planes.

Range control warning device is a device that can be set by an equipment operator to warn that the boom or jib tip is at a plane or multiple planes.

Rated capacity means the maximum working load permitted by the manufacturer under specified working conditions. Such working conditions typically include a specific combination of factors such as equipment configuration, radii, boom length, and other parameters of use.

Rated capacity indicator: See load moment indicator.

Rated capacity limiter: See load moment limiter.

Repetitive pickup points refer to, when operating on a short cycle operation, the rope being used on a single layer and being spooled repetitively over a short portion of the drum.

Running wire rope means a wire rope that moves over sheaves or drums.

Runway means a firm, level surface designed, prepared and designated as a path of travel for the weight and configuration of the crane being used to lift and travel with the crane suspended platform. An existing surface may be used as long as it meets these criteria.

Section means a section of this subpart, unless otherwise specified.

Sideboom crane means a track-type or wheel-type tractor having a boom mounted on the side of the tractor, used for lifting, lowering or transporting a load

## App. 103

suspended on the load hook. The boom or hook can be lifted or lowered in a vertical direction only.

Special hazard warnings means warnings of site-specific hazards (for example, proximity of power lines).

Stability (flotation device) means the tendency of a barge, pontoons, vessel or other means of flotation to return to an upright position after having been inclined by an external force.

Standard Method means the protocol in Appendix A of this subpart for hand signals.

Such as means “such as, but not limited to.”

Superstructure: See Upperworks.

Tagline means a rope (usually fiber) attached to a lifted load for purposes of controlling load spinning and pendular motions or used to stabilize a bucket or magnet during material handling operations.

Tender means an individual responsible for monitoring and communicating with a diver.

Tilt up or tilt down operation means raising/lowering a load from the horizontal to vertical or vertical to horizontal.

Tower crane is a type of lifting structure which utilizes a vertical mast or tower to support a working boom (jib) in an elevated position. Loads are suspended from the working boom. While the working boom may be of the fixed type (horizontal or angled) or have luffing

capability, it can always rotate to swing loads, either by rotating on the top of the tower (top slewing) or by the rotation of the tower (bottom slewing). The tower base may be fixed in one location or ballasted and moveable between locations. Mobile cranes that are configured with luffing jib and/or tower attachments are not considered tower cranes under this section.

Travel bogie (tower cranes) is an assembly of two or more axles arranged to permit vertical wheel displacement and equalize the loading on the wheels.

Trim means angle of inclination about the transverse axis of a barge, pontoons, vessel or other means of floatation.

Two blocking means a condition in which a component that is uppermost on the hoist line such as the load block, hook block, overhaul ball, or similar component, comes in contact with the boom tip, fixed upper block or similar component. This binds the system and continued application of power can cause failure of the hoist rope or other component.

Unavailable procedures means procedures that are no longer available from the manufacturer, or have never been available, from the manufacturer.

Upperstructure: See Upperworks.

Upperworks means the revolving frame of equipment on which the operating machinery (and many cases the engine) are mounted along with the operator's cab. The



counterweight is typically supported on the rear of the upperstructure and the boom or other front end attachment is mounted on the front.

Up to means “up to and including.”

Wire rope means a flexible rope constructed by laying steel wires into various patterns of multi-wired strands around a core system to produce a helically wound rope.

**§ 1926.1402 Ground conditions.**

(a) Definitions.

(1) “Ground conditions” means the ability of the ground to support the equipment (including slope, compaction, and firmness).

(2) “Supporting materials” means blocking, mats, cribbing, marsh buggies (in marshes/wetlands), or similar supporting materials or devices.

(b) The equipment must not be assembled or used unless ground conditions are firm, drained, and graded to a sufficient extent so that, in conjunction (if necessary) with the use of supporting materials, the equipment manufacturer’s specifications for adequate support and degree of level of the equipment are met. The requirement for the ground to be drained does not apply to marshes/wetlands.

- (c) The controlling entity must:
  - (1) Ensure that ground preparations necessary to meet the requirements in paragraph (b) of this section are provided.
  - (2) Inform the user of the equipment and the operator of the location of hazards beneath the equipment set-up area (such as voids, tanks, utilities) if those hazards are identified in documents (such as site drawings, as-built drawings, and soil analyses) that are in the possession of the controlling entity (whether at the site or off-site) or the hazards are otherwise known to that controlling entity.
- (d) If there is no controlling entity for the project, the requirement in paragraph (c)(1) of this section must be met by the employer that has authority at the site to make or arrange for ground preparations needed to meet paragraph (b) of this section.
- (e) If the A/D director or the operator determines that ground conditions do not meet the requirements in paragraph (b) of this section, that person's employer must have a discussion with the controlling entity regarding the ground preparations that are needed so that, with the use of suitable supporting materials/devices (if necessary), the requirements in paragraph (b) of this section can be met.
- (f) This section does not apply to cranes designed for use on railroad tracks when used on railroad tracks that are part of the general railroad system of transportation that is regulated pursuant to the

Federal Railroad Administration under 49 CFR part 213 and that comply with applicable Federal Railroad Administration requirements.

**§ 1926.1403 Assembly/Disassembly – selection of manufacturer or employer procedures.**

When assembling or disassembling equipment (or attachments), the employer must comply with all applicable manufacturer prohibitions and must comply with either:

(a) Manufacturer procedures applicable to assembly and disassembly, or

(b) Employer procedures for assembly and disassembly. Employer procedures may be used only where the employer can demonstrate that the procedures used meet the requirements in § 1926.1406. NOTE: The employer must follow manufacturer procedures when an employer uses synthetic slings during assembly or disassembly rigging. (See § 1926.1404(r).)

**§ 1926.1404 Assembly/Disassembly – general requirements (applies to all assembly and disassembly operations).**

(a) *Supervision – competent-qualified person.*

(1) Assembly/disassembly must be directed by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons (“A/D director”).

(2) Where the assembly/disassembly is being performed by only one person, that person must meet the criteria for both a competent person and a qualified person. For purposes of this standard, that person is considered the A/D director.

(b) Knowledge of procedures. The A/D director must understand the applicable assembly/disassembly procedures.

(c) Review of procedures. The A/D director must review the applicable assembly/disassembly procedures immediately prior to the commencement of assembly/disassembly unless the A/D director understands the procedures and has applied them to the same type and configuration of equipment (including accessories, if any).

(d) Crew instructions.

(1) Before commencing assembly/disassembly operations, the A/D director must ensure that the crew members understand all of the following:

(i) Their tasks.

(ii) The hazards associated with their tasks.

(iii) The hazardous positions/locations that they need to avoid.

(2) During assembly/disassembly operations, before a crew member takes on a different task, or when adding new personnel during the operations, the requirements in paragraphs (d)(1)(i) through (d)(1)(iii) of this section must be met.

(e) Protecting assembly/disassembly crew members out of operator view.

(1) Before a crew member goes to a location that is out of view of the operator and is either in, on, or under the equipment, or near the equipment (or load) where the crew member could be injured by movement of the equipment (or load), the crew member must inform the operator that he/she is going to that location.

(2) Where the operator knows that a crew member went to a location covered by paragraph (e)(1) of this section, the operator must not move any part of the equipment (or load) until the operator is informed in accordance with a prearranged system of communication that the crew member is in a safe position.

(f) Working under the boom, jib or other components.

(1) When pins (or similar devices) are being removed, employees must not be under the boom, jib, or other components, except where the requirements of paragraph (f)(2) of this section are met.

(2) Exception. Where the employer demonstrates that site constraints require one or more employees to be under the boom, jib, or other components when pins (or similar devices) are being removed, the A/D director must implement procedures that minimize the risk of unintended dangerous movement and minimize the duration and extent of exposure under the boom. (See Non-mandatory Appendix B of this subpart for an example.)

(g) Capacity limits. During all phases of assembly/disassembly, rated capacity limits for loads imposed on the equipment, equipment components (including rigging), lifting lugs and equipment accessories, must not be exceeded for the equipment being assembled/disassembled.

(h) Addressing specific hazards. The A/D director supervising the assembly/disassembly operation must address the hazards associated with the operation, which include:

(1) Site and ground bearing conditions. Site and ground conditions must be adequate for safe assembly/disassembly operations and to support the equipment during assembly/disassembly (see § 1926.1402 for ground condition requirements).

(2) Blocking material. The size, amount, condition and method of stacking the blocking must be sufficient to sustain the loads and maintain stability.

App. 111

(3) Proper location of blocking. When used to support lattice booms or components, blocking must be appropriately placed to:

- (i) Protect the structural integrity of the equipment, and
- (ii) Prevent dangerous movement and collapse.

(4) Verifying assist crane loads. When using an assist crane, the loads that will be imposed on the assist crane at each phase of assembly/disassembly must be verified in accordance with § 1926.1417(o)(3) before assembly/disassembly begins.

(5) Boom and jib pick points. The point(s) of attachment of rigging to a boom (or boom sections or jib or jib sections) must be suitable for preventing structural damage and facilitating safe handling of these components.

(6) Center of gravity.

- (i) The center of gravity of the load must be identified if that is necessary for the method used for maintaining stability.
- (ii) Where there is insufficient information to accurately identify the center of gravity, measures designed to prevent unintended dangerous movement resulting from an inaccurate identification of the center of gravity must

be used. (See Non-mandatory Appendix B of this subpart for an example.)

(7) Stability upon pin removal. The boom sections, boom suspension systems (such as gantry A-frames and jib struts), and components must be rigged or supported to maintain stability upon the removal of the pins.

(8) Snagging. Suspension ropes and pendants must not be allowed to catch on the boom or jib connection pins or cotter pins (including keepers and locking pins).

(9) Struck by counterweights. The potential for unintended movement from inadequately supported counterweights and from hoisting counterweights.

(10) Boom hoist brake failure. Each time reliance is to be placed on the boom hoist brake to prevent boom movement during assembly/disassembly, the brake must be tested prior to such reliance to determine if it is sufficient to prevent boom movement. If it is not sufficient, a boom hoist pawl, other locking device/back-up braking device, or another method of preventing dangerous movement of the boom (such as blocking or using an assist crane) from a boom hoist brake failure must be used.

(11) Loss of backward stability. Backward stability before swinging the upperworks, travel,



App. 113

and when attaching or removing equipment components.

(12) Wind speed and weather. The effect of wind speed and weather on the equipment.

(i) [Reserved.]

(j) Cantilevered boom sections. Manufacturer limitations on the maximum amount of boom supported only by cantilevering must not be exceeded. Where these are unavailable, a registered professional engineer familiar with the type of equipment involved must determine in writing this limitation, which must not be exceeded.

(k) Weight of components. The weight of each of the components must be readily available.

(l) [Reserved.]

(m) Components and configuration.

(1) The selection of components, and configuration of the equipment, that affect the capacity or safe operation of the equipment must be in accordance with:

(i) Manufacturer instructions, prohibitions, limitations, and specifications. Where these are unavailable, a registered professional engineer familiar with the type of equipment involved must approve, in

App. 114

writing, the selection and configuration of components; or

(ii) Approved modifications that meet the requirements of § 1926.1434 (Equipment modifications).

(2) Post-assembly inspection. Upon completion of assembly, the equipment must be inspected to ensure compliance with paragraph (m)(1) of this section (see § 1926.1412(c) for post-assembly inspection requirements).

(n) Reserved.

(o) Shipping pins. Reusable shipping pins, straps, links, and similar equipment must be removed. Once they are removed they must either be stowed or otherwise stored so that they do not present a falling object hazard.

(p) Pile driving. Equipment used for pile driving must not have a jib attached during pile driving operations.

(q) Outriggers and Stabilizers. When the load to be handled and the operating radius require the use of outriggers or stabilizers, or at any time when outriggers or stabilizers are used, all of the following requirements must be met (except as otherwise indicated):

(1) The outriggers or stabilizers must be either fully extended or, if manufacturer procedures permit, deployed as specified in the load chart.

App. 115

(2) The outriggers must be set to remove the equipment weight from the wheels, except for locomotive cranes (see paragraph (q)(6) of this section for use of outriggers on locomotive cranes). This provision does not apply to stabilizers.

(3) When outrigger floats are used, they must be attached to the outriggers. When stabilizer floats are used, they must be attached to the stabilizers.

(4) Each outrigger or stabilizer must be visible to the operator or to a signal person during extension and setting.

(5) Outrigger and stabilizer blocking must:

(i) Meet the requirements in paragraphs (h)(2) and (h)(3) of this section.

(ii) Be placed only under the outrigger or stabilizer float/pad of the jack or, where the outrigger or stabilizer is designed without a jack, under the outer bearing surface of the extended outrigger or stabilizer beam.

(6) For locomotive cranes, when using outriggers or stabilizers to handle loads, the manufacturer's procedures must be followed. When lifting loads without using outriggers or stabilizers, the manufacturer's procedures must be met regarding truck wedges or screws.

App. 116

(r) Rigging. In addition to following the requirements in 29 CFR 1926.251 and other requirements in this and other standards applicable to rigging, when rigging is used for assembly/disassembly, the employer must ensure that:

(1) The rigging work is done by a qualified rigger.

(2) Synthetic slings are protected from: abrasive, sharp or acute edges, and configurations that could cause a reduction of the sling's rated capacity, such as distortion or localized compression. NOTE: Requirements for the protection of wire rope slings are contained in 29 CFR 1926.251(c)(9).

(3) When synthetic slings are used, the synthetic sling manufacturer's instructions, limitations, specifications and recommendations must be followed.

**§ 1926.1405 Disassembly - additional requirements for dismantling of booms and jibs (applies to both the use of manufacturer procedures and employer procedures).**

*Dismantling (including dismantling for changing the length of) booms and jibs.*

(a) None of the pins in the pendants are to be removed (partly or completely) when the pendants are in tension.

App. 117

(b) None of the pins (top or bottom) on boom sections located between the pendant attachment points and the crane/derrick body are to be removed (partly or completely) when the pendants are in tension.

(c) None of the pins (top or bottom) on boom sections located between the uppermost boom section and the crane/derrick body are to be removed (partly or completely) when the boom is being supported by the uppermost boom section resting on the ground (or other support).

(d) None of the top pins on boom sections located on the cantilevered portion of the boom being removed (the portion being removed ahead of the pendant attachment points) are to be removed (partly or completely) until the cantilevered section to be removed is fully supported.

**§ 1926.1406 Assembly/Disassembly – employer procedures – general requirements.**

(a) When using employer procedures instead of manufacturer procedures for assembly/disassembly, the employer must ensure that the procedures:

(1) Prevent unintended dangerous movement, and prevent collapse, of any part of the equipment.

(2) Provide adequate support and stability of all parts of the equipment.

(3) Position employees involved in the assembly/disassembly operation so that their

exposure to unintended movement or collapse of part or all of the equipment is minimized.

(b) Qualified person. Employer procedures must be developed by a qualified person.

**§ 1926.1407 Power line safety (up to 350 kV) – assembly and disassembly.**

(a) Before assembling or disassembling equipment, the employer must determine if any part of the equipment, load line, or load (including rigging and lifting accessories) could get, in the direction or area of assembly/disassembly, closer than 20 feet to a power line during the assembly/disassembly process. If so, the employer must meet the requirements in Option (1), Option (2), or Option (3) of this section, as follows:

(1) Option (1) – Deenergize and ground. Confirm from the utility owner/operator that the power line has been deenergized and visibly grounded at the worksite.

(2) Option (2) – 20 foot clearance. Ensure that no part of the equipment, load line or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures specified in paragraph (b) of this section.

(3) Option (3) – Table A clearance.

(i) Determine the line's voltage and the minimum clearance distance

permitted under Table A (see § 1926.1408).

(ii) Determine if any part of the equipment, load line, or load (including rigging and lifting accessories), could get closer than the minimum clearance distance to the power line permitted under Table A (see §1926.1408). If so, then the employer must follow the requirements in paragraph (b) of this section to ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum clearance distance.

(b) Preventing encroachment/electrocution. Where encroachment precautions are required under Option (2), or Option (3) of this section, all of the following requirements must be met:

(1) Conduct a planning meeting with the Assembly/Disassembly director (A/D director), operator, assembly/disassembly crew and the other workers who will be in the assembly/disassembly area to review the location of the power line(s) and the steps that will be implemented to prevent encroachment/electrocution.

(2) If tag lines are used, they must be nonconductive.

(3) At least one of the following additional measures must be in place. The measure

App. 120

selected from this list must be effective in preventing encroachment. The additional measures are:

(i) Use a dedicated spotter who is in continuous contact with the equipment operator. The dedicated spotter must:

(A) Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: a clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).

(B) Be positioned to effectively gauge the clearance distance.

(C) Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.

(D) Give timely information to the operator so that the required clearance distance can be maintained.

(ii) A proximity alarm set to give the operator sufficient warning to prevent encroachment.



App. 121

(iii) A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.

(iv) A device that automatically limits range of movement, set to prevent encroachment.

(v) An elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings.

(c) Assembly/disassembly below power lines prohibited. No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed below a power line unless the employer has confirmed that the utility owner/operator has deenergized and (at the worksite) visibly grounded the power line.

(d) Assembly/disassembly inside Table A clearance prohibited. No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed closer than the minimum approach distance under Table A (see § 1926.1408) to a power line unless the employer has confirmed that the utility owner/operator has deenergized and (at the worksite) visibly grounded the power line.

(e) Voltage information. Where Option (3) of this section is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of the employer's request.

(f) Power lines presumed energized. The employer must assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be deenergized and visibly grounded at the worksite.

(g) Posting of electrocution warnings. There must be at least one electrocution hazard warning conspicuously posted in the cab so that it is in view of the operator and (except for overhead gantry and tower cranes) at least two on the outside of the equipment.

**§ 1926.1408 Power line safety (up to 350 kV) – equipment operations.**

(a) Hazard assessments and precautions inside the work zone. Before beginning equipment operations, the employer must:

(1) Identify the work zone by either:

(i) Demarcating boundaries (such as with flags, or a device such as a range limit device or range control warning device) and prohibiting the operator from operating the equipment past those boundaries, or

(ii) Defining the work zone as the area 360 degrees around the equipment, up to

App. 123

the equipment's maximum working radius.

(2) Determine if any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone, could get closer than 20 feet to a power line. If so, the employer must meet the requirements in Option (1), Option (2), or Option (3) of this section, as follows:

(i) Option (1) – Deenergize and ground. Confirm from the utility owner/operator that the power line has been deenergized and visibly grounded at the work site.

(ii) Option (2) – 20 foot clearance. Ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures specified in paragraph (b) of this section.

(iii) Option (3) – Table A clearance.

(A) Determine the line's voltage and the minimum approach distance permitted under Table A (see § 1926.1408).

(B) Determine if any part of the equipment, load line or load (including

rigging and lifting accessories), while operating up to the equipment's maximum working radius in the work zone, could get closer than the minimum approach distance of the power line permitted under Table A (see § 1926.1408). If so, then the employer must follow the requirements in paragraph (b) of this section to ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum approach distance.

(b) Preventing encroachment/electrocution. Where encroachment precautions are required under Option (2) or Option (3) of this section, all of the following requirements must be met:

- (1) Conduct a planning meeting with the operator and the other workers who will be in the area of the equipment or load to review the location of the power line(s), and the steps that will be implemented to prevent encroachment/electrocution.
- (2) If tag lines are used, they must be non-conductive.
- (3) Erect and maintain an elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings, at 20 feet from the power line (if using Option (2) of this section) or at the

minimum approach distance under Table A (see § 1926.1408) (if using Option (3) of this section). If the operator is unable to see the elevated warning line, a dedicated spotter must be used as described in § 1926.1408(b)(4)(ii) in addition to implementing one of the measures described in §§ 1926.1408(b)(4)(i), (iii), (iv) and (v).

(4) Implement at least one of the following measures:

- (i) A proximity alarm set to give the operator sufficient warning to prevent encroachment.

- (ii) A dedicated spotter who is in continuous contact with the operator. Where this measure is selected, the dedicated spotter must:

- (A) Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: a clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).

- (B) Be positioned to effectively gauge the clearance distance.

App. 126

(C) Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.

(D) Give timely information to the operator so that the required clearance distance can be maintained.

(iii) A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.

(iv) A device that automatically limits range of movement, set to prevent encroachment.

(v) An insulating link/device, as defined in § 1926.1401, installed at a point between the end of the load line (or below) and the load.

(5) The requirements of paragraph (b)(4) of this section do not apply to work covered by subpart V of this part.

(c) Voltage information. Where Option (3) of this section is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of the employer's request.

(d) Operations below power lines.

(1) No part of the equipment, load line, or load (including rigging and lifting accessories) is allowed below a power line unless the employer has confirmed that the utility owner/operator has deenergized and (at the worksite) visibly grounded the power line, except where one of the exceptions in paragraph (d)(2) of this section applies.

(2) Exceptions. Paragraph (d)(1) of this section is inapplicable where the employer demonstrates that one of the following applies:

(i) The work is covered by subpart V of this part.

(ii) For equipment with non-extensible booms: The uppermost part of the equipment, with the boom at true vertical, would be more than 20 feet below the plane of the power line or more than the Table A of this section minimum clearance distance below the plane of the power line.

(iii) For equipment with articulating or extensible booms: The upper most part of the equipment, with the boom in the fully extended position, at true vertical, would be more than 20 feet below the plane of the power line or more than the Table A of this section minimum clearance

distance below the plane of the power line.

(iv) The employer demonstrates that compliance with paragraph (d)(1) of this section is infeasible and meets the requirements of § 1926.1410.

(e) Power lines presumed energized. The employer must assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be deenergized and visibly grounded at the work site.

(f) When working near transmitter/communication towers where the equipment is close enough for an electrical charge to be induced in the equipment or materials being handled, the transmitter must be deenergized or the following precautions must be taken:

(1) The equipment must be provided with an electrical ground.

(2) If tag lines are used, they must be non-conductive.

(g) Training.

(1) The employer must train each operator and crew member assigned to work with the equipment on all of the following:



(i) The procedures to be followed in the event of electrical contact with a power line. Such training must include:

(A) Information regarding the danger of electrocution from the operator simultaneously touching the equipment and the ground.

(B) The importance to the operator's safety of remaining inside the cab except where there is an imminent danger of fire, explosion, or other emergency that necessitates leaving the cab.

(C) The safest means of evacuating from equipment that may be energized.

(D) The danger of the potentially energized zone around the equipment (step potential).

(E) The need for crew in the area to avoid approaching or touching the equipment and the load.

(F) Safe clearance distance from power lines.

(ii) Power lines are presumed to be energized unless the utility owner/operator confirms that the power line has been and continues to be

App. 130

deenergized and visibly grounded at the work site.

(iii) Power lines are presumed to be uninsulated unless the utility owner/operator or a registered engineer who is a qualified person with respect to electrical power transmission and distribution confirms that a line is insulated.

(iv) The limitations of an insulating link/device, proximity alarm, and range control (and similar) device, if used.

(v) The procedures to be followed to properly ground equipment and the limitations of grounding.

(2) Employees working as dedicated spotters must be trained to enable them to effectively perform their task, including training on the applicable requirements of this section.

(3) Training under this section must be administered in accordance with §1926.1430(g).

(h) Devices originally designed by the manufacturer for use as: a safety device (see §1926.1415), operational aid, or a means to prevent power line contact or electrocution, when used to comply with this section, must meet the manufacturer's procedures for use and conditions of use.

**Table A – Minimum Clearance Distances**

Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)
<p>Note: The value that follows “to” is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.</p>	

**§ 1926.1409 Power line safety (over 350 kV ).**

The requirements of § 1926.1407 and § 1926.1408 apply to power lines over 350 kV except:

- (a) For power lines at or below 1000 kV, wherever the distance “20 feet” is specified, the distance “50 feet” must be substituted; and
- (b) For power lines over 1000 kV, the minimum clearance distance must be established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution.

**§ 1926.1410 Power line safety (all voltages) – equipment operations closer than the Table A zone.**

Equipment operations in which any part of the equipment, load line, or load (including rigging and lifting accessories) is closer than the minimum approach distance under Table A of § 1926.1408 to an energized power line is prohibited, except where the employer demonstrates that all of the following requirements are met:

- (a) The employer determines that it is infeasible to do the work without breaching the minimum approach distance under Table A of § 1926.1408.
- (b) The employer determines that, after consultation with the utility owner/operator, it is infeasible to deenergize and ground the power line or relocate the power line.

(c) Minimum clearance distance.

(1) The power line owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution determines the minimum clearance distance that must be maintained to prevent electrical contact in light of the on-site conditions. The factors that must be considered in making this determination include, but are not limited to: conditions affecting atmospheric conductivity; time necessary to bring the equipment, load line, and load (including rigging and lifting accessories) to a complete stop; wind conditions; degree of sway in the power line; lighting conditions, and other conditions affecting the ability to prevent electrical contact.

(2) Paragraph (c)(1) of this section does not apply to work covered by subpart V of this part; instead, for such work, the minimum clearance distances specified in § 1926.950 Table V-1 apply. Employers engaged in subpart V work are permitted to work closer than the distances in § 1926.950 Table V-1 where both the requirements of this section and § 1926.952(c)(3)(i) or (ii) are met.

(d) A planning meeting with the employer and utility owner/operator (or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution) is held to determine the procedures that will be followed to prevent electrical contact and electrocution. At a minimum these procedures must include:

App. 134

(1) If the power line is equipped with a device that automatically reenergizes the circuit in the event of a power line contact, before the work begins, the automatic reclosing feature of the circuit interrupting device must be made inoperative if the design of the device permits.

(2) A dedicated spotter who is in continuous contact with the operator. The dedicated spotter must:

(i) Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: a line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).

(ii) Be positioned to effectively gauge the clearance distance.

(iii) Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.

(iv) Give timely information to the operator so that the required clearance distance can be maintained.

(3) An elevated warning line, or barricade (not attached to the crane), in view of the

operator (either directly or through video equipment), equipped with flags or similar high-visibility markings, to prevent electrical contact. However, this provision does not apply to work covered by subpart V of this part.

(4) Insulating link/device.

(i) An insulating link/device installed at a point between the end of the load line (or below) and the load.

(ii) For work covered by subpart V of this part, the requirement in paragraph (d)(4)(i) of this section applies only when working inside the §1926.950 Table V-1 clearance distances.

(iii) For work covered by subpart V of this part involving operations where use of an insulating link/device is infeasible, the requirements of §1910.269(p)(4)(iii)(B) or (C) may be substituted for the requirement in (d)(4)(i) of this section.

(iv) Until [INSERT DATE 1 YEAR AND 90 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER], the following procedure may be substituted for the requirement in paragraph (d)(4)(i) of this section: all employees, excluding equipment operators located on the equipment, who may come in contact with the equipment, the load line, or the load must be insulated or guarded from the

equipment, the load line, and the load. Insulating gloves rated for the voltage involved are adequate insulation for the purposes of this paragraph.

(v) Until [INSERT DATE 3 YEARS AND 90 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER], the following procedure may be substituted for the requirement in (d)(4)(i) of this section:

(A)The employer must use a link/device manufactured on or before [INSERT DATE 1 YEAR AND 90 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER], that meets the definition of an insulating link/device, except that it has not been approved by a Nationally Recognized Testing Laboratory, and that is maintained and used in accordance with manufacturer requirements and recommendations, and is installed at a point between the end of the load line (or below) and the load; and

(B)All employees, excluding equipment operators located on the equipment, who may come in contact with the equipment, the load line, or the load must be insulated or guarded from the equipment, the load line, and the load through an additional means other than the device described in



App. 137

paragraph (d)(4)(v)(A) of this section. Insulating gloves rated for the voltage involved are adequate additional means of protection for the purposes of this paragraph.

(5) Nonconductive rigging if the rigging may be within the Table A of §1926.1408 distance during the operation.

(6) If the equipment is equipped with a device that automatically limits range of movement, it must be used and set to prevent any part of the equipment, load line, or load (including rigging and lifting accessories) from breaching the minimum approach distance established under paragraph (c) of this section.

(7) If a tag line is used, it must be of the nonconductive type.

(8) Barricades forming a perimeter at least 10 feet away from the equipment to prevent unauthorized personnel from entering the work area. In areas where obstacles prevent the barricade from being at least 10 feet away, the barricade must be as far from the equipment as feasible.

(9) Workers other than the operator must be prohibited from touching the load line above the insulating link/device and crane. Operators remotely operating the equipment from the ground must use either wireless controls that isolate the operator from the equipment or

insulating mats that insulate the operator from the ground.

(10) Only personnel essential to the operation are permitted to be in the area of the crane and load.

(11) The equipment must be properly grounded.

(12) Insulating line hose or cover-up must be installed by the utility owner/operator except where such devices are unavailable for the line voltages involved.

(e) The procedures developed to comply with paragraph (d) of this section are documented and immediately available on-site.

(f) The equipment user and utility owner/operator (or registered professional engineer) meet with the equipment operator and the other workers who will be in the area of the equipment or load to review the procedures that will be implemented to prevent breaching the minimum approach distance established in paragraph (c) of this section and prevent electrocution.

(g) The procedures developed to comply with paragraph (d) of this section are implemented.

(h) The utility owner/operator (or registered professional engineer) and all employers of employees involved in the work must identify one person who will direct the implementation of the procedures. The

person identified in accordance with this paragraph must direct the implementation of the procedures and must have the authority to stop work at any time to ensure safety.

(i) [Reserved.]

(j) If a problem occurs implementing the procedures being used to comply with paragraph (d) of this section, or indicating that those procedures are inadequate to prevent electrocution, the employer must safely stop operations and either develop new procedures to comply with paragraph (d) of this section or have the utility owner/operator deenergize and visibly ground or relocate the power line before resuming work.

(k) Devices originally designed by the manufacturer for use as a safety device (see §1926.1415), operational aid, or a means to prevent power line contact or electrocution, when used to comply with this section, must comply with the manufacturer's procedures for use and conditions of use.

(l) [Reserved.]

(m) The employer must train each operator and crew member assigned to work with the equipment in accordance with § 1926.1408(g).

**§ 1926.1411 Power line safety – while traveling under or near power lines with no load.**

(a) This section establishes procedures and criteria that must be met for equipment traveling under or near a power line on a construction site with no load. Equipment traveling on a construction site with a load is governed by §§ 1926.1408, 1926.1409 or 1926.1410, whichever is appropriate, and § 1926.1417(u).

(b) The employer must ensure that:

(1) The boom/mast and boom/mast support system are lowered sufficiently to meet the requirements of this paragraph.

(2) The clearances specified in Table T of this section are maintained.

(3) The effects of speed and terrain on equipment movement (including movement of the boom/mast) are considered so that those effects do not cause the minimum clearance distances specified in Table T of this section to be breached.

(4) *Dedicated spotter*. If any part of the equipment while traveling will get closer than 20 feet to the power line, the employer must ensure that a dedicated spotter who is in continuous contact with the driver/operator is used. The dedicated spotter must:

(i) Be positioned to effectively gauge the clearance distance.

App. 141

(ii) Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.

(iii) Give timely information to the operator so that the required clearance distance can be maintained.

(5) Additional precautions for traveling in poor visibility. When traveling at night, or in conditions of poor visibility, in addition to the measures specified in paragraphs (b)(1) through (4) of this section, the employer must ensure that:

(i) The power lines are illuminated or another means of identifying the location of the lines is used.

(ii) A safe path of travel is identified and used.

**Table T – Minimum Clearance Distances While  
Traveling With No Load**

Voltage (nominal, kV, alternating current)	While Traveling – Minimum clearance distance (feet)
up to 0.75	4
over .75 to 50	6
over 50 to 345	10
over 345 to 750	16
Over 750 to 1,000	20
Over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)

**§ 1926.1412 Inspections.**

(a) *Modified equipment.*

(1) Equipment that has had modifications or additions which affect the safe operation of the equipment (such as modifications or additions involving a safety device or operational aid, critical part of a control system, power plant, braking system, load-sustaining structural

components, load hook, or in-use operating mechanism) or capacity must be inspected by a qualified person after such modifications/additions have been completed, prior to initial use. The inspection must meet all of the following requirements:

(i) The inspection must assure that the modifications or additions have been done in accordance with the approval obtained pursuant to § 1926.1434 (Equipment modifications).

(ii) The inspection must include functional testing of the equipment.

(2) Equipment must not be used until an inspection under this paragraph demonstrates that the requirements of paragraph (a)(1)(i) of this section have been met.

(b) Repaired / adjusted equipment.

(1) Equipment that has had a repair or adjustment that relates to safe operation (such as: a repair or adjustment to a safety device or operator aid, or to a critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism), must be inspected by a qualified person after such a repair or adjustment has been completed, prior to initial use. The inspection must meet all of the following requirements:

(i) The qualified person must determine if the repair/adjustment meets manufacturer equipment criteria (where applicable and available).

(ii) Where manufacturer equipment criteria are unavailable or inapplicable, the qualified person must:

(A) Determine if a registered professional engineer (RPE) is needed to develop criteria for the repair/adjustment. If an RPE is not needed, the employer must ensure that the criteria are developed by the qualified person. If an RPE is needed, the employer must ensure that they are developed by an RPE.

(B) Determine if the repair/adjustment meets the criteria developed in accordance with paragraph (b)(1)(ii)(A) of this section.

(iii) The inspection must include functional testing of the repaired/adjusted parts and other components that may be affected by the repair/adjustment.

(4) Equipment must not be used until an inspection under this paragraph demonstrates that the repair/adjustment meets the requirements of paragraph (b)(1)(i) of this section (or, where applicable, paragraph (b)(1)(ii) of this section).



(c) Post-assembly.

(1) Upon completion of assembly, the equipment must be inspected by a qualified person to assure that it is configured in accordance with manufacturer equipment criteria.

(2) Where manufacturer equipment criteria are unavailable, a qualified person must:

(i) Determine if a registered professional engineer (RPE) familiar with the type of equipment involved is needed to develop criteria for the equipment configuration. If an RPE is not needed, the employer must ensure that the criteria are developed by the qualified person. If an RPE is needed, the employer must ensure that they are developed by an RPE.

(ii) Determine if the equipment meets the criteria developed in accordance with paragraph (c)(2)(i) of this section.

(3) Equipment must not be used until an inspection under this paragraph demonstrates that the equipment is configured in accordance with the applicable criteria.

(d) Each shift.

(1) A competent person must begin a visual inspection prior to each shift the equipment will be used, which must be completed before or

during that shift. The inspection must consist of observation for apparent deficiencies. Taking apart equipment components and booming down is not required as part of this inspection unless the results of the visual inspection or trial operation indicate that further investigation necessitating taking apart equipment components or booming down is needed. Determinations made in conducting the inspection must be reassessed in light of observations made during operation. At a minimum the inspection must include all of the following:

- (i) Control mechanisms for maladjustments interfering with proper operation.
- (ii) Control and drive mechanisms for apparent excessive wear of components and contamination by lubricants, water or other foreign matter.
- (iii) Air, hydraulic, and other pressurized lines for deterioration or leakage, particularly those which flex in normal operation.
- (iv) Hydraulic system for proper fluid level.
- (v) Hooks and latches for deformation, cracks, excessive wear, or damage such as from chemicals or heat.

App. 147

(vi) Wire rope reeving for compliance with the manufacturer's specifications.

(vii) Wire rope, in accordance with § 1926.1413(a).

(viii) Electrical apparatus for malfunctioning, signs of apparent excessive deterioration, dirt or moisture accumulation.

(ix) Tires (when in use) for proper inflation and condition.

(x) Ground conditions around the equipment for proper support, including ground settling under and around outriggers/stabilizers and supporting foundations, ground water accumulation, or similar conditions. This paragraph does not apply to the inspection of ground conditions for railroad tracks and their underlying support when the railroad tracks are part of the general railroad system of transportation that is regulated pursuant to the Federal Railroad Administration under 49 CFR part 213.

(xi) The equipment for level position within the tolerances specified by the equipment manufacturer's recommendations, both before each shift and after each move and setup.

App. 148

(xii) Operator cab windows for significant cracks, breaks, or other deficiencies that would hamper the operator's view.

(xiii) Rails, rail stops, rail clamps and supporting surfaces when the equipment has rail traveling. This paragraph does not apply to the inspection of rails, rail stops, rail clamps and supporting surfaces when the railroad tracks are part of the general railroad system of transportation that is regulated pursuant to the Federal Railroad Administration under 49 CFR part 213.

(xiv) Safety devices and operational aids for proper operation.

(2) If any deficiency in paragraphs (d)(1)(i) through (xiii) of this section (or in additional inspection items required to be checked for specific types of equipment in accordance with other sections of this standard) is identified, an immediate determination must be made by the competent person as to whether the deficiency constitutes a safety hazard. If the deficiency is determined to constitute a safety hazard, the equipment must be taken out of service until it has been corrected. See § 1926.1417.

(3) If any deficiency in paragraph (d)(1)(xiv) of this section (safety devices/operational aids) is identified, the action specified in § 1926.1415

and §1926.1416 must be taken prior to using the equipment.

(e) Monthly.

(1) Each month the equipment is in service it must be inspected in accordance with paragraph (d) of this section (each shift).

(2) Equipment must not be used until an inspection under this paragraph demonstrates that no corrective action under paragraphs (d)(2) and (3) of this section is required.

(3) Documentation.

(i) The following information must be documented and maintained by the employer that conducts the inspection:

(A) The items checked and the results of the inspection.

(B) The name and signature of the person who conducted the inspection and the date.

(ii) This document must be retained for a minimum of three months.

(f) Annual / comprehensive.

(1) At least every 12 months the equipment must be inspected by a qualified person in accordance with paragraph (d) of this section (each shift)

App. 150

except that the corrective action set forth in paragraphs (f)(4), (f)(5), and (f)(6) of this section must apply in place of the corrective action required by paragraphs (d)(2) and (d)(3) of this section.

(2) In addition, at least every 12 months, the equipment must be inspected by a qualified person. Disassembly is required, as necessary, to complete the inspection. The equipment must be inspected for all of the following:

(i) Equipment structure (including the boom and, if equipped, the jib):

(A) Structural members: deformed, cracked, or significantly corroded.

(B) Bolts, rivets and other fasteners: loose, failed or significantly corroded.

(C) Welds for cracks.

(ii) Sheaves and drums for cracks or significant wear.

(iii) Parts such as pins, bearings, shafts, gears, rollers and locking devices for distortion, cracks or significant wear.

(iv) Brake and clutch system parts, linings, pawls and ratchets for excessive wear.

App. 151

(v) Safety devices and operational aids for proper operation (including significant inaccuracies).

(vi) Gasoline, diesel, electric, or other power plants for safety-related problems (such as leaking exhaust and emergency shut-down feature) and conditions, and proper operation.

(vii) Chains and chain drive sprockets for excessive wear of sprockets and excessive chain stretch.

(viii) Travel steering, brakes, and locking devices, for proper operation.

(ix) Tires for damage or excessive wear.

(x) Hydraulic, pneumatic and other pressurized hoses, fittings and tubing, as follows:

(A) Flexible hose or its junction with the fittings for indications of leaks.

(B) Threaded or clamped joints for leaks.

(C) Outer covering of the hose for blistering, abnormal deformation or other signs of failure/impending failure.

App. 152

(D)Outer surface of a hose, rigid tube, or fitting for indications of excessive abrasion or scrubbing.

(xi) Hydraulic and pneumatic pumps and motors, as follows:

(A)Performance indicators: unusual noises or vibration, low operating speed, excessive heating of the fluid, low pressure.

(B)Loose bolts or fasteners.

(C)Shaft seals and joints between pump sections for leaks.

(xii) Hydraulic and pneumatic valves, as follows:

(A)Spools: sticking, improper return to neutral, and leaks.

(B)Leaks.

(C)Valve housing cracks.

(D)Relief valves: failure to reach correct pressure (if there is a manufacturer procedure for checking pressure, it must be followed).

(xiii) Hydraulic and pneumatic cylinders, as follows:



App. 153

- (A) Drifting caused by fluid leaking across the piston.
- (B) Rod seals and welded joints for leaks.
- (C) Cylinder rods for scores, nicks, or dents.
- (D) Case (barrel) for significant dents.
- (E) Rod eyes and connecting joints: loose or deformed.
- (xiv) Outrigger or stabilizer pads/floats for excessive wear or cracks.
- (xv) Slider pads for excessive wear or cracks
- (xvi) Electrical components and wiring for cracked or split insulation and loose or corroded terminations.
- (xvii) Warning labels and decals originally supplied with the equipment by the manufacturer or otherwise required under this standard: missing or unreadable.
- (xviii) Originally equipped operator seat (or equivalent): missing.
- (xix) Operator seat: unserviceable.

App. 154

(xx) Originally equipped steps, ladders, handrails, guards: missing.

(xxi) Steps, ladders, handrails, guards: in unusable/unsafe condition.

(3) This inspection must include functional testing to determine that the equipment as configured in the inspection is functioning properly.

(4) If any deficiency is identified, an immediate determination must be made by the qualified person as to whether the deficiency constitutes a safety hazard or, though not yet a safety hazard, needs to be monitored in the monthly inspections.

(5) If the qualified person determines that a deficiency is a safety hazard, the equipment must be taken out of service until it has been corrected, except when temporary alternative measures are implemented as specified in § 1926.1416(d) or § 1926.1435(e). See § 1926.1417.

(6) If the qualified person determines that, though not presently a safety hazard, the deficiency needs to be monitored, the employer must ensure that the deficiency is checked in the monthly inspections.

(7) Documentation of annual/comprehensive inspection. The following information must be documented, maintained, and retained for a

App. 155

minimum of 12 months, by the employer that conducts the inspection:

(i) The items checked and the results of the inspection.

(ii) The name and signature of the person who conducted the inspection and the date.

(g) Severe service. Where the severity of use/conditions is such that there is a reasonable probability of damage or excessive wear (such as loading that may have exceeded rated capacity, shock loading that may have exceeded rated capacity, prolonged exposure to a corrosive atmosphere), the employer must stop using the equipment and a qualified person must:

(1) Inspect the equipment for structural damage to determine if the equipment can continue to be used safely.

(2) In light of the use/conditions determine whether any items/conditions listed in paragraph (f) of this section need to be inspected; if so, the qualified person must inspect those items/conditions.

(3) If a deficiency is found, the employer must follow the requirements in paragraphs (f)(4) through (6) of this section.

(h) *Equipment not in regular use*. Equipment that has been idle for 3 months or more must be inspected by a

qualified person in accordance with the requirements of paragraph

(e) (Monthly) of this section before initial use.

(i) [Reserved.]

(j) Any part of a manufacturer's procedures regarding inspections that relate to safe operation (such as to a safety device or operational aid, critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) that is more comprehensive or has a more frequent schedule of inspection than the requirements of this section must be followed.

(k) All documents produced under this section must be available, during the applicable document retention period, to all persons who conduct inspections under this section.

**§ 1926.1413 Wire rope – inspection.**

(a) Shift inspection.

(1) A competent person must begin a visual inspection prior to each shift the equipment is used, which must be completed before or during that shift. The inspection must consist of observation of wire ropes (running and standing) that are likely to be in use during the shift for apparent deficiencies, including those listed in paragraph (a)(2) of this section. Untwisting

(opening) of wire rope or booming down is not required as part of this inspection.

(2) Apparent deficiencies.

(i) Category I. Apparent deficiencies in this category include the following:

(A) Significant distortion of the wire rope structure such as kinking, crushing, unstranding, birdcaging, signs of core failure or steel core protrusion between the outer strands.

(B) Significant corrosion.

(C) Electric arc damage (from a source other than power lines) or heat damage.

(D) Improperly applied end connections.

(E) Significantly corroded, cracked, bent, or worn end connections (such as from severe service).

(ii) Category II. Apparent deficiencies in this category are:

(A) Visible broken wires, as follows:

(1) In running wire ropes: six randomly distributed broken wires in one rope lay or three broken

App. 158

wires in one strand in one rope lay, where a rope lay is the length along the rope in which one strand makes a complete revolution around the rope.

(2) In rotation resistant ropes: two randomly distributed broken wires in six rope diameters or four randomly distributed broken wires in 30 rope diameters.

(3) In pendants or standing wire ropes: more than two broken wires in one rope lay located in rope beyond end connections and/or more than one broken wire in a rope lay located at an end connection.

(B) A diameter reduction of more than 5% from nominal diameter.

(iii) Category III. Apparent deficiencies in this category include the following:

(A) In rotation resistant wire rope, core protrusion or other distortion indicating core failure.

(B) Prior electrical contact with a power line.

(C) A broken strand.

(3) Critical review items. The competent person must give particular attention to all of the following:

- (i) Rotation resistant wire rope in use.
- (ii) Wire rope being used for boom hoists and luffing hoists, particularly at reverse bends.
- (iii) Wire rope at flange points, crossover points and repetitive pickup points on drums.
- (iv) Wire rope at or near terminal ends.
- (v) Wire rope in contact with saddles, equalizer sheaves or other sheaves where rope travel is limited.

(4) Removal from service.

(i) If a deficiency in Category I (see paragraph (a)(2)(i) of this section) is identified, an immediate determination must be made by the competent person as to whether the deficiency constitutes a safety hazard. If the deficiency is determined to constitute a safety hazard, operations involving use of the wire rope in question must be prohibited until:

(A) The wire rope is replaced (see § 1926.1417), or

App. 160

(B) If the deficiency is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened under this paragraph, the employer must ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

(ii) If a deficiency in Category II (see paragraph (a)(2)(ii) of this section) is identified, operations involving use of the wire rope in question must be prohibited until:

(A) The employer complies with the wire rope manufacturer's established criterion for removal from service or a different criterion that the wire rope manufacturer has approved in writing for that specific wire rope (see § 1926.1417),

(B) The wire rope is replaced (see § 1926.1417), or

(C) If the deficiency is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is



App. 161

shortened under this paragraph, the employer must ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

(iii) If a deficiency in Category III is identified, operations involving use of the wire rope in question must be prohibited until:

(A) The wire rope is replaced (see § 1926.1417), or

(B) If the deficiency (other than power line contact) is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. Repair of wire rope that contacted an energized power line is also prohibited. If a rope is shortened under this paragraph, the employer must ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

(iv) Where a wire rope is required to be removed from service under this section, either the equipment (as a whole) or the hoist with that wire rope must be tagged-out, in accordance with § 1926.1417(f)(1), until the wire rope is repaired or replaced.

(b) Monthly inspection.

(1) Each month an inspection must be conducted in accordance with paragraph (a) (shift inspection) of this section.

(2) The inspection must include any deficiencies that the qualified person who conducts the annual inspection determines under paragraph (c)(3)(ii) of this section must be monitored.

(3) Wire ropes on equipment must not be used until an inspection under this paragraph demonstrates that no corrective action under paragraph (a)(4) of this section is required.

(4) The inspection must be documented according to § 1926.1412(e)(3) (monthly inspection documentation).

(c) Annual/comprehensive.

(1) At least every 12 months, wire ropes in use on equipment must be inspected by a qualified person in accordance with paragraph (a) of this section (shift inspection).

(2) In addition, at least every 12 months, the wire ropes in use on equipment must be inspected by a qualified person, as follows:

(i) The inspection must be for deficiencies of the types listed in paragraph (a)(2) of this section.

(ii) The inspection must be complete and thorough, covering the surface of the entire length of the wire ropes, with particular attention given to all of the following:

(A) Critical review items listed in paragraph (a)(3) of this section.

(B) Those sections that are normally hidden during shift and monthly inspections.

(C) Wire rope subject to reverse bends.

(D) Wire rope passing over sheaves.

(iii) Exception: In the event an inspection under paragraph (c)(2) of this section is not feasible due to existing set-up and configuration of the equipment (such as where an assist crane is needed) or due to site conditions (such as a dense urban setting), such inspections must be conducted as soon as it becomes feasible, but no longer than an additional 6 months for running ropes and, for standing ropes, at the time of disassembly.

(3) If a deficiency is identified, an immediate determination must be made by the qualified person as to whether the deficiency constitutes a safety hazard.

App. 164

(i) If the deficiency is determined to constitute a safety hazard, operations involving use of the wire rope in question must be prohibited until:

(A) The wire rope is replaced (see § 1926.1417), or

(B) If the deficiency is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened under this paragraph, the employer must ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

(ii) If the qualified person determines that, though not presently a safety hazard, the deficiency needs to be monitored, the employer must ensure that the deficiency is checked in the monthly inspections.

(4) The inspection must be documented according to § 1926.1412(f)(7) (annual/comprehensive inspection documentation).

(d) Rope lubricants that are of the type that hinder inspection must not be used.

(e) All documents produced under this section must be available, during the applicable document retention period, to all persons who conduct inspections under this section.

**§ 1926.1414 Wire rope – selection and installation criteria.**

(a) Original equipment wire rope and replacement wire rope must be selected and installed in accordance with the requirements of this section. Selection of replacement wire rope must be in accordance with the recommendations of the wire rope manufacturer, the equipment manufacturer, or a qualified person.

(b) Wire rope design criteria: Wire rope (other than rotation resistant rope) must comply with either Option (1) or Option (2) of this section, as follows:

(1) Option (1). Wire rope must comply with section 5-1.7.1 of ASME B30.5-2004 (incorporated by reference, see § 1926.6) except that section's paragraph (c) must not apply.

(2) Option (2). Wire rope must be designed to have, in relation to the equipment's rated capacity, a sufficient minimum breaking force and design factor so that compliance with the applicable inspection provisions in § 1926.1413 will be an effective means of preventing sudden rope failure.

(c) Wire rope must be compatible with the safe functioning of the equipment.

(d) Boom hoist reeving.

(1) Fiber core ropes must not be used for boom hoist reeving, except for derricks.

(2) Rotation resistant ropes must be used for boom hoist reeving only where the requirements of paragraph (e)(4)(ii) of this section are met.

(e) Rotation resistant ropes.

(1) Definitions.

(i) Type I rotation resistant wire rope ("Type I"). Type I rotation resistant rope is stranded rope constructed to have little or no tendency to rotate or, if guided, transmits little or no torque. It has at least 15 outer strands and comprises an assembly of at least three layers of strands laid helically over a center in two operations. The direction of lay of the outer strands is opposite to that of the underlying layer.

(ii) Type II rotation resistant wire rope ("Type II"). Type II rotation resistant rope is stranded rope constructed to have significant resistance to rotation. It has at least 10 outer strands and comprises an assembly of two or more layers of strands laid helically over a center in two or three operations. The direction of lay of the outer strands is opposite to that of the underlying layer.

(iii) Type III rotation resistant wire rope ("Type III"). Type III rotation resistant rope is stranded rope constructed to have limited resistance to rotation. It has no more than nine outer strands, and comprises an assembly of two layers of strands laid helically over a center in two operations. The direction of lay of the outer strands is opposite to that of the underlying layer.

(2) Requirements.

(i) Types II and III with an operating design factor of less than 5 must not be used for duty cycle or repetitive lifts.

(ii) Rotation resistant ropes (including Types I, II and III) must have an operating design factor of no less than 3.5.

(iii) Type I must have an operating design factor of no less than 5, except where the wire rope manufacturer and the equipment manufacturer approves the design factor, in writing.

(iv) Types II and III must have an operating design factor of no less than 5, except where the requirements of paragraph (e)(3) of this section are met.

(3) When Types II and III with an operating design factor of less than 5 are used (for non-duty cycle, non-repetitive lifts), the following

requirements must be met for each lifting operation:

(i) A qualified person must inspect the rope in accordance with § 1926.1413(a). The rope must be used only if the qualified person determines that there are no deficiencies constituting a hazard. In making this determination, more than one broken wire in any one rope lay must be considered a hazard.

(ii) Operations must be conducted in such a manner and at such speeds as to minimize dynamic effects.

(iii) Each lift made under § 1926.1414(e)(3) must be recorded in the monthly and annual inspection documents. Such prior uses must be considered by the qualified person in determining whether to use the rope again.

(4) Additional requirements for rotation resistant ropes for boom hoist reeving.

(i) Rotation resistant ropes must not be used for boom hoist reeving, except where the requirements of paragraph (e)(4)(ii) of this section are met.

(ii) Rotation resistant ropes may be used as boom hoist reeving when load hoists are used as boom hoists for



attachments such as luffing attachments or boom and mast attachment systems. Under these conditions, all of the following requirements must be met:

(A) The drum must provide a first layer rope pitch diameter of not less than 18 times the nominal diameter of the rope used.

(B) The requirements in § 1926.1426(a) (irrespective of the date of manufacture of the equipment), and § 1926.1426(b).

(C) The requirements in ASME B30.5-2004 sections 5-1.3.2(a), (a)(2) through (a)(4), (b) and (d) (incorporated by reference, see § 1926.6) except that the minimum pitch diameter for sheaves used in multiple rope reeving is 18 times the nominal diameter of the rope used (instead of the value of 16 specified in section 5-1.3.2(d)).

(D) All sheaves used in the boom hoist reeving system must have a rope pitch diameter of not less than 18 times the nominal diameter of the rope used.

(E) The operating design factor for the boom hoist reeving system must be not less than five.

App. 170

(F) The operating design factor for these ropes must be the total minimum breaking force of all parts of rope in the system divided by the load imposed on the rope system when supporting the static weights of the structure and the load within the equipment's rated capacity.

(G) When provided, a power-controlled lowering system must be capable of handling rated capacities and speeds as specified by the manufacturer.

(f) Wire rope clips used in conjunction with wedge sockets must be attached to the unloaded dead end of the rope only, except that the use of devices specifically designed for dead-ending rope in a wedge socket is permitted.

(g) Socketing must be done in the manner specified by the manufacturer of the wire rope or fitting.

(h) Prior to cutting a wire rope, seizings must be placed on each side of the point to be cut. The length and number of seizings must be in accordance with the wire rope manufacturer's instructions.

**§ 1926.1415 Safety devices.**

(a) *Safety devices.* The following safety devices are required on all equipment covered by this subpart, unless otherwise specified:

(1) *Crane level indicator.*

App. 171

(i) The equipment must have a crane level indicator that is either built into the equipment or is available on the equipment.

(ii) If a built-in crane level indicator is not working properly, it must be tagged-out or removed. If a removable crane level indicator is not working properly, it must be removed.

(iii) This requirement does not apply to portal cranes, derricks, floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation.

(2) Boom stops, except for derricks and hydraulic booms.

(3) Jib stops (if a jib is attached), except for derricks.

(4) Equipment with foot pedal brakes must have locks.

(5) Hydraulic outrigger jacks and hydraulic stabilizer jacks must have an integral holding device/check valve.

(6) Equipment on rails must have rail clamps and rail stops, except for portal cranes.

(7) Horn

(i) The equipment must have a horn that is either built into the equipment or is on the equipment and immediately available to the operator.

(ii) If a built-in horn is not working properly, it must be tagged-out or removed. If a removable horn is not working properly, it must be removed.

(b) *Proper operation required.* Operations must not begin unless all of the devices listed in this section are in proper working order. If a device stops working properly during operations, the operator must safely stop operations. If any of the devices listed in this section are not in proper working order, the equipment must be taken out of service and operations must not resume until the device is again working properly. See § 1926.1417 (Operation). Alternative measures are not permitted to be used.

**§ 1926.1416 Operational aids.**

(a) The devices listed in this section (“listed operational aids”) are required on all equipment covered by this subpart, unless otherwise specified.

(1) The requirements in paragraphs (e)(1), (e)(2), and (e)(3) of this section do not apply to articulating cranes.

(2) The requirements in paragraphs (d)(3), (e)(1), and (e)(4) of this section apply only to those

digger derricks manufactured after [INSERT DATE 1 YEAR AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Operations must not begin unless the listed operational aids are in proper working order, except where an operational aid is being repaired the employer uses the specified temporary alternative measures. The time periods permitted for repairing defective operational aids are specified in paragraphs (d) and (e) of this section. More protective alternative measures specified by the crane/derrick manufacturer, if any, must be followed.

(c) If a listed operational aid stops working properly during operations, the operator must safely stop operations until the temporary alternative measures are implemented or the device is again working properly. If a replacement part is no longer available, the use of a substitute device that performs the same type of function is permitted and is not considered a modification under § 1926.1434.

(d) Category I operational aids and alternative measures. Operational aids listed in this paragraph that are not working properly must be repaired no later than 7 calendar days after the deficiency occurs. Exception: If the employer documents that it has ordered the necessary parts within 7 calendar days of the occurrence of the deficiency, the repair must be completed within 7 calendar days of receipt of the parts. See § 1926.1417(j) for additional requirements.

(1) Boom hoist limiting device.

(i) For equipment manufactured after December 16, 1969, a boom hoist limiting device is required. Temporary alternative measures (use at least one). One or more of the following methods must be used:

(A) Use a boom angle indicator.

(B) Clearly mark the boom hoist cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to keep the boom within the minimum allowable radius. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.

(C) Clearly mark the boom hoist cable (so that it can easily be seen by a spotter) at a point that will give the spotter sufficient time to signal the operator and have the operator stop the hoist to keep the boom within the minimum allowable radius.

(ii) If the equipment was manufactured on or before December 16, 1969, and is not equipped with a boom hoist limiting device, at least one of the measures in paragraphs (d)(1)(i)(A) through (C) of this section must be used.

(2) Luffing jib limiting device. Equipment with a luffing jib must have a luffing jib limiting device. Temporary alternative measures are the same as in paragraph (d)(1)(i) of this section, except to limit the movement of the luffing jib rather than the boom hoist.

(3) Anti two-blocking device.

(i) Telescopic boom cranes manufactured after February 28, 1992, must be equipped with a device which automatically prevents damage from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device(s) must prevent such damage at all points where two-blocking could occur. Temporary alternative measures: Clearly mark the cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, and use a spotter when extending the boom.

(ii) Lattice boom cranes.

(A) Lattice boom cranes manufactured after Feb 28, 1992, must be equipped with a device that either automatically prevents damage and load failure from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block

or similar component), or warns the operator in time for the operator to prevent two-blocking. The device must prevent such damage/failure or provide adequate warning for all points where two-blocking could occur.

(B) Lattice boom cranes and derricks manufactured after [INSERT DATE 1 YEAR AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] must be equipped with a device which automatically prevents damage and load failure from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device(s) must prevent such damage/failure at all points where two-blocking could occur.

(C) Exception. The requirements in paragraphs (d)(3)(ii)(A) and (B) of this section do not apply to such lattice boom equipment when used for dragline, clamshell (grapple), magnet, drop ball, container handling, concrete bucket, marine operations that do not involve hoisting personnel, and pile driving work.

(D) Temporary alternative measures. Clearly mark the cable (so that it can easily be seen by the operator) at a



point that will give the operator sufficient time to stop the hoist to prevent two-blocking, or use a spotter.

(iii) Articulating cranes manufactured after December 31, 1999, that are equipped with a load hoist must be equipped with a device that automatically prevents damage from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device must prevent such damage at all points where two-blocking could occur. Temporary alternative measures: When two-blocking could only occur with movement of the load hoist, clearly mark the cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, or use a spotter. When two-blocking could occur without movement of the load hoist, clearly mark the cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, and use a spotter when extending the boom.

(e) Category II operational aids and alternative measures. Operational aids listed in this paragraph that are not working properly must be repaired no later than 30 calendar days after the deficiency occurs. Exception: If the employer documents that it has ordered the necessary parts within 7 calendar days of

the occurrence of the deficiency, and the part is not received in time to complete the repair in 30 calendar days, the repair must be completed within 7 calendar days of receipt of the parts. See § 1926.1417(j) for additional requirements.

(1) Boom angle or radius indicator. The equipment must have a boom angle or radius indicator readable from the operator's station. Temporary alternative measures: Radii or boom angle must be determined by measuring the radii or boom angle with a measuring device.

(2) Jib angle indicator if the equipment has a luffing jib. Temporary alternative measures: Radii or jib angle must be determined by ascertaining the main boom angle and then measuring the radii or jib angle with a measuring device.

(3) Boom length indicator if the equipment has a telescopic boom, except where the rated capacity is independent of the boom length. Temporary alternative measures. One or more of the following methods must be used:

- (i) Mark the boom with measured marks to calculate boom length,
- (ii) Calculate boom length from boom angle and radius measurements,
- (iii) Measure the boom with a measuring device.

(4) Load weighing and similar devices.

(i) Equipment (other than derricks and articulating cranes) manufactured after March 29, 2003 with a rated capacity over 6,000 pounds must have at least one of the following: load weighing device, load moment (or rated capacity) indicator, or load moment (or rated capacity) limiter. Temporary alternative measures: The weight of the load must be determined from a source recognized by the industry (such as the load's manufacturer) or by a calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight). This information must be provided to the operator prior to the lift.

(ii) Articulating cranes manufactured after [INSERT DATE 1 YEAR AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] must have at least one of the following: automatic overload prevention device, load weighing device, load moment (or rated capacity) indicator, or load moment (rated capacity) limiter. Temporary alternative measures: The weight of the load must be determined from a source recognized by the industry (such as the load's manufacturer) or by a calculation method recognized by the industry (such as calculating a steel beam from

App. 180

measured dimensions and a known per foot weight). This information must be provided to the operator prior to the lift.

(5) The following devices are required on equipment manufactured after [INSERT DATE 1 YEAR AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]:

(i) Outrigger/stabilizer position (horizontal beam extension) sensor/monitor if the equipment has outriggers or stabilizers. *Temporary alternative measures*: the operator must verify that the position of the outriggers or stabilizers is correct (in accordance with manufacturer procedures) before beginning operations requiring outrigger or stabilizer deployment.

(ii) Hoist drum rotation indicator if the equipment has a hoist drum not visible from the operator's station. *Temporary alternative measures*: Mark the drum to indicate the rotation of the drum. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.

**§ 1926.1417 Operation.**

(a) The employer must comply with all manufacturer procedures applicable to the operational functions of equipment, including its use with attachments.

(b) Unavailable operation procedures.

(1) Where the manufacturer procedures are unavailable, the employer must develop and ensure compliance with all procedures necessary for the safe operation of the equipment and attachments.

(2) Procedures for the operational controls must be developed by a qualified person.

(3) Procedures related to the capacity of the equipment must be developed and signed by a registered professional engineer familiar with the equipment.

(c) Accessibility of procedures.

(1) The procedures applicable to the operation of the equipment, including rated capacities (load charts), recommended operating speeds, special hazard warnings, instructions, and operator's manual, must be readily available in the cab at all times for use by the operator.

(2) Where rated capacities are available in the cab only in electronic form: in the event of a failure which makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities (in electronic or other form) are available.

(d) The operator must not engage in any practice or activity that diverts his/her attention while actually

engaged in operating the equipment, such as the use of cellular phones (other than when used for signal communications).

(e) Leaving the equipment unattended.

(1) The operator must not leave the controls while the load is suspended, except where all of the following are met:

(i) The operator remains adjacent to the equipment and is not engaged in any other duties.

(ii) The load is to be held suspended for a period of time exceeding normal lifting operations.

(iii) The competent person determines that it is safe to do so and implements measures necessary to restrain the boom hoist and telescoping, load, swing, and outrigger or stabilizer functions.

(iv) Barricades or caution lines, and notices, are erected to prevent all employees from entering the fall zone. No employees, including those listed in §§ 1926.1425(b)(1) through (3), § 1926.1425(d) or § 1926.1425(e), are permitted in the fall zone.

(2) The provisions in § 1926.1417(e)(1) do not apply to working gear (such as slings, spreader bars, ladders, and welding machines) where the

weight of the working gear is negligible relative to the lifting capacity of the equipment as positioned, and the working gear is suspended over an area other than an entrance or exit.

(f) Tag-out.

(1) Tagging out of service equipment / functions.

Where the employer has taken the equipment out of service, a tag must be placed in the cab stating that the equipment is out of service and is not to be used. Where the employer has taken a function(s) out of service, a tag must be placed in a conspicuous position stating that the function is out of service and is not to be used.

(2) Response to “do not operate” / tag-out signs.

(i) If there is a warning (tag-out or maintenance/do not operate) sign on the equipment or starting control, the operator must not activate the switch or start the equipment until the sign has been removed by a person authorized to remove it, or until the operator has verified that:

(A) No one is servicing, working on, or otherwise in a dangerous position on the machine.

(B) The equipment has been repaired and is working properly.

(ii) If there is a warning (tag-out or maintenance/do not operate) sign on any other switch or control, the operator must not activate that switch or control until the sign has been removed by a person authorized to remove it, or until the operator has verified that the requirements in paragraphs (f)(2)(i)(A) and (B) of this section have been met.

(g) Before starting the engine, the operator must verify that all controls are in the proper starting position and that all personnel are in the clear.

(h) Storm warning. When a local storm warning has been issued, the competent person must determine whether it is necessary to implement manufacturer recommendations for securing the equipment.

(i) [Reserved.]

(j) If equipment adjustments or repairs are necessary:

(1) The operator must, in writing, promptly inform the person designated by the employer to receive such information and, where there are successive shifts, to the next operator; and

(2) The employer must notify all affected employees, at the beginning of each shift, of the necessary adjustments or repairs and all alternative measures.



App. 185

(k) Safety devices and operational aids must not be used as a substitute for the exercise of professional judgment by the operator.

(l) [Reserved.]

(m) If the competent person determines that there is a slack rope condition requiring respooling of the rope, it must be verified (before starting to lift) that the rope is seated on the drum and in the sheaves as the slack is removed.

(n) The competent person must adjust the equipment and/or operations to address the effect of wind, ice, and snow on equipment stability and rated capacity.

(o) Compliance with rated capacity.

(1) The equipment must not be operated in excess of its rated capacity.

(2) The operator must not be required to operate the equipment in a manner that would violate paragraph (o)(1) of this section.

(3) Load weight. The operator must verify that the load is within the rated capacity of the equipment by at least one of the following methods:

(i) The weight of the load must be determined from a source recognized by the industry (such as the load's manufacturer), or by a calculation method

recognized by the industry (such as calculating a steel beam measured dimensions and a known per foot weight), or by other equally reliable means. In addition, when requested by the operator, this information must be provided to the operator prior to the lift; or

(ii) The operator must begin hoisting the load to determine, using a load weighing device, load moment indicator, rated capacity indicator, or rated capacity limiter, if it exceeds 75 percent of the maximum rated capacity at the longest radius that will be used during the lift operation. If it does, the operator must not proceed with the lift until he/she verifies the weight of the load in accordance with paragraph (o)(3)(i) of this section.

(p) The boom or other parts of the equipment must not contact any obstruction.

(q) The equipment must not be used to drag or pull loads sideways.

(r) On wheel-mounted equipment, no loads must be lifted over the front area, except as permitted by the manufacturer.

(s) The operator must test the brakes each time a load that is 90% or more of the maximum line pull is handled by lifting the load a few inches and applying the brakes. In duty cycle and repetitive lifts where each

lift is 90% or more of the maximum line pull, this requirement applies to the first lift but not to successive lifts.

(t) Neither the load nor the boom must be lowered below the point where less than two full wraps of rope remain on their respective drums.

(u) Traveling with a load.

(1) Traveling with a load is prohibited if the practice is prohibited by the manufacturer.

(2) Where traveling with a load, the employer must ensure that:

(i) A competent person supervises the operation, determines if it is necessary to reduce rated capacity, and makes determinations regarding load position, boom location, ground support, travel route, overhead obstructions, and speed of movement necessary to ensure safety.

(ii) The determinations of the competent person required in paragraph (u)(2)(i) of this section are implemented.

(iii) For equipment with tires, tire pressure specified by the manufacturer is maintained.

(v) Rotational speed of the equipment must be such that the load does not swing out beyond the radius at which it can be controlled.

App. 188

(w) A tag or restraint line must be used if necessary to prevent rotation of the load that would be hazardous.

(x) The brakes must be adjusted in accordance with manufacturer procedures to prevent unintended movement.

(y) The operator must obey a stop (or emergency stop) signal, irrespective of who gives it.

(z) Swinging locomotive cranes. A locomotive crane must not be swung into a position where railway cars on an adjacent track could strike it, until it is determined that cars are not being moved on the adjacent track and that proper flag protection has been established.

(aa) Counterweight / ballast.

(1) The following applies to equipment other than tower cranes:

(i) Equipment must not be operated without the counterweight or ballast in place as specified by the manufacturer.

(ii) The maximum counterweight or ballast specified by the manufacturer for the equipment must not be exceeded.

(2) Counterweight/ballast requirements for tower cranes are specified in § 1926.1435(b)(8).

**§ 1926.1418 Authority to stop operation.**

Whenever there is a concern as to safety, the operator must have the authority to stop and refuse to handle loads until a qualified person has determined that safety has been assured.

**§ 1926.1419 Signals – general requirements.**

(a) A signal person must be provided in each of the following situations:

(1) The point of operation, meaning the load travel or the area near or at load placement, is not in full view of the operator.

(2) When the equipment is traveling, the view in the direction of travel is obstructed.

(3) Due to site specific safety concerns, either the operator or the person handling the load determines that it is necessary.

(b) Types of signals. Signals to operators must be by hand, voice, audible, or new signals.

(c) Hand signals.

(1) When using hand signals, the Standard Method must be used (see Appendix A of this subpart). *Exception:* Where use of the Standard Method for hand signals is infeasible, or where an operation or use of an attachment is not covered in the Standard Method, non-standard

hand signals may be used in accordance with paragraph (c)(2) of this section.

(2) Non-standard hand signals. When using non-standard hand signals, the signal person, operator, and lift director (where there is one) must contact each other prior to the operation and agree on the non-standard hand signals that will be used.

(d) New signals. Signals other than hand, voice, or audible signals may be used where the employer demonstrates that:

(1) The new signals provide at least equally effective communication as voice, audible, or Standard Method hand signals, or

(2) The new signals comply with a national consensus standard that provides at least equally effective communication as voice, audible, or Standard Method hand signals.

(e) Suitability. The signals used (hand, voice, audible, or new), and means of transmitting the signals to the operator (such as direct line of sight, video, radio, etc.), must be appropriate for the site conditions.

(f) During operations requiring signals, the ability to transmit signals between the operator and signal person must be maintained. If that ability is interrupted at any time, the operator must safely stop operations requiring signals until it is reestablished and a proper signal is given and understood.

App. 191

(g) If the operator becomes aware of a safety problem and needs to communicate with the signal person, the operator must safely stop operations. Operations must not resume until the operator and signal person agree that the problem has been resolved.

(h) Only one person may give signals to a crane/derrick at a time, except in circumstances covered by paragraph

(j) of this section.

(i) [Reserved.]

(j) Anyone who becomes aware of a safety problem must alert the operator or signal person by giving the stop or emergency stop signal. (NOTE: § 1926.1417(y) requires the operator to obey a stop or emergency stop signal).

(k) All directions given to the operator by the signal person must be given from the operator's direction perspective.

(l) [Reserved.]

(m) Communication with multiple cranes/derricks. Where a signal person(s) is in communication with more than one crane/derrick, a system must be used for identifying the crane/derrick each signal is for, as follows:

(1) for each signal, prior to giving the function/direction, the signal person must identify the crane/derrick the signal is for, or

App. 192

(2) must use an equally effective method of identifying which crane/derrick the signal is for.

**§ 1926.1420 Signals – radio, telephone or other electronic transmission of signals.**

(a) The device(s) used to transmit signals must be tested on site before beginning operations to ensure that the signal transmission is effective, clear, and reliable.

(b) Signal transmission must be through a dedicated channel, except:

(1) Multiple cranes/derricks and one or more signal persons may share a dedicated channel for the purpose of coordinating operations.

(2) Where a crane is being operated on or adjacent to railroad tracks, and the actions of the crane operator need to be coordinated with the movement of other equipment or trains on the same or adjacent tracks.

(c) The operator's reception of signals must be by a hands-free system.

**§1926.1421 Signals – voice signals – additional requirements.**

(a) Prior to beginning operations, the operator, signal person and lift director (if there is one), must contact each other and agree on the voice signals that will be used. Once the voice signals are agreed upon, these workers need not meet again to discuss voice



signals unless another worker is added or substituted, there is confusion about the voice signals, or a voice signal is to be changed.

(b) Each voice signal must contain the following three elements, given in the following order: function (such as hoist, boom, etc.), direction; distance and/or speed; function, stop command.

(c) The operator, signal person and lift director (if there is one), must be able to effectively communicate in the language used.

**§ 1926.1422 Signals – hand signal chart.**

Hand signal charts must be either posted on the equipment or conspicuously posted in the vicinity of the hoisting operations.

**§ 1926.1423 Fall protection.**

(a) Application.

(1) Paragraphs (b), (c)(3), (e) and (f) of this section apply to all equipment covered by this subpart except tower cranes.

(2) Paragraphs (c)(1), (c)(2), (d), (g), (j) and (k) of this section apply to all equipment covered by this subpart.

(3) Paragraphs (c)(4) and (h) of this section apply only to tower cranes.

(b) Boom walkways.

(1) Equipment manufactured after [INSERT DATE 1 YEAR AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] with lattice booms must be equipped with walkways on the boom(s) if the vertical profile of the boom (from cord centerline to cord centerline) is 6 or more feet.

(2) *Boom walkway criteria.*

(i) The walkways must be at least 12 inches wide.

(ii) Guardrails, railings and other permanent fall protection attachments along walkways are:

(A) Not required.

(B) Prohibited on booms supported by pendant ropes or bars if the guardrails/railings/attachments could be snagged by the ropes or bars.

(C) Prohibited if of the removable type (designed to be installed and removed each time the boom is assembled/disassembled).

(D) Where not prohibited, guardrails or railings may be of any height up to, but not more than, 45 inches.

(c) Steps, handholds, ladders, grabrails, guardrails and railings.

(1) Section 1926.502(b) does not apply to equipment covered by this subpart.

(2) The employer must maintain in good condition originally-equipped steps, handholds, ladders and guardrails/railings/grabrails.

(3) Equipment manufactured after [INSERT DATE 1 YEAR AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] must be equipped so as to provide safe access and egress between the ground and the operator work station(s), including the forward and rear positions, by the provision of devices such as steps, handholds, ladders, and guardrails /railings/grabrails. These devices must meet the following criteria:

(i) Steps, handholds, ladders and guardrails/railings/grabrails must meet the criteria of SAE J185 (May 2003) (incorporated by reference, see § 1926.6) or ISO 11660-2:1994(E) (incorporated by reference, see § 1926.6) except where infeasible.

(ii) Walking/stepping surfaces, except for crawler treads, must have slip-resistant features/properties (such as diamond plate metal, strategically placed grip tape, expanded metal, or slip-resistant paint).

(4) Tower cranes manufactured after [INSERT DATE 1 YEAR AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] must be equipped so as to provide safe access and egress between the ground and the cab, machinery platforms, and tower (mast), by the provision of devices such as steps, handholds, ladders, and guardrails/railings/grabrails. These devices must meet the following criteria:

(i) Steps, handholds, ladders, and guardrails/railings/grabrails must meet the criteria of ISO 11660-1:2008(E) (incorporated by reference, see § 1926.6) and ISO 11660-3:2008(E) (incorporated by reference, see § 1926.6) or SAE J185 (May 2003) (incorporated by reference, see § 1926.6) except where infeasible.

(ii) Walking/stepping surfaces must have slip-resistant features/properties (such as diamond plate metal, strategically placed grip tape, expanded metal, or slip-resistant paint).

(d) Personal fall arrest and fall restraint systems. Personal fall arrest system components must be used in personal fall arrest and fall restraint systems and must conform to the criteria in § 1926.502(d) except that § 1926.502(d)(15) does not apply to components used in personal fall arrest and fall restraint systems. Either body belts or body harnesses must be used in personal fall arrest and fall restraint systems.

App. 197

(e) For non-assembly/disassembly work, the employer must provide and ensure the use of fall protection equipment for employees who are on a walking/working surface with an unprotected side or edge more than 6 feet above a lower level as follows:

(1) When moving point-to-point:

(i) On non-lattice booms (whether horizontal or not horizontal).

(ii) On lattice booms that are not horizontal.

(iii) On horizontal lattice booms where the fall distance is 15 feet or more.

(2) While at a work station on any part of the equipment (including the boom, of any type), except when the employee is at or near draw-works (when the equipment is running), in the cab, or on the deck.

(f) For assembly/disassembly work, the employer must provide and ensure the use of fall protection equipment for employees who are on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level, except when the employee is at or near draw-works (when the equipment is running), in the cab, or on the deck.

(g) Anchorage criteria.

(1) Sections 1926.502(d)(15) and 1926.502(e)(2) apply to equipment covered by this subpart only

App. 198

to the extent delineated in paragraph (g)(2) of this section.

(2) Anchorages for personal fall arrest and positioning device systems.

(i) Personal fall arrest systems must be anchored to any apparently substantial part of the equipment unless a competent person, from a visual inspection, without an engineering analysis, would conclude that the criteria in § 1926.502(d)(15) would not be met.

(ii) Positioning device systems must be anchored to any apparently substantial part of the equipment unless a competent person, from a visual inspection, without an engineering analysis, would conclude that the criteria in § 1926.502(e)(2) would not be met.

(iii) Attachable anchor devices (portable anchor devices that are attached to the equipment) must meet the anchorage criteria in § 1926.502(d)(15) for personal fall arrest systems and § 1926.502(e)(2) for positioning device systems.

(3) Anchorages for fall restraint systems. Fall restraint systems must be anchored to any part of the equipment that is capable of withstanding twice the maximum load that an employee may impose on it during reasonably anticipated conditions of use.

(h) Tower cranes.

(1) For work other than erecting, climbing, and dismantling, the employer must provide and ensure the use of fall protection equipment for employees who are on a walking/working surface with an unprotected side or edge more than 6 feet above a lower level, except when the employee is at or near draw-works (when the equipment is running), in the cab, or on the deck.

(2) For erecting, climbing, and dismantling work, the employer must provide and ensure the use of fall protection equipment for employees who are on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level.

(i) [Reserved.]

(j) Anchoring to the load line. A personal fall arrest system is permitted to be anchored to the crane/derrick's hook (or other part of the load line) where all of the following requirements are met:

(1) A qualified person has determined that the set-up and rated capacity of the crane/derrick (including the hook, load line and rigging) meets or exceeds the requirements in § 1926.502(d)(15).

(2) The equipment operator must be at the work site and informed that the equipment is being used for this purpose.

App. 200

(3) No load is suspended from the load line when the personal fall arrest system is anchored to the crane/derrick's hook (or other part of the load line).

(k) Training. The employer must train each employee who may be exposed to fall hazards while on, or hoisted by, equipment covered by this subpart on all of the following:

(1) the requirements in this subpart that address fall protection.

(2) the applicable requirements in §§ 1926.500 and 1926.502.

**§ 1926.1424 Work area control.**

(a) Swing radius hazards.

(1) The requirements in paragraph (a)(2) of this section apply where there are accessible areas in which the equipment's rotating superstructure (whether permanently or temporarily mounted) poses a reasonably foreseeable risk of:

(i) Striking and injuring an employee;  
or

(ii) Pinching/crushing an employee against another part of the equipment or another object.

(2) To prevent employees from entering these hazard areas, the employer must:



App. 201

(i) Train each employee assigned to work on or near the equipment (“authorized personnel”) in how to recognize struck-by and pinch/crush hazard areas posed by the rotating superstructure.

(ii) Erect and maintain control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas. *Exception:* When the employer can demonstrate that it is neither feasible to erect such barriers on the ground nor on the equipment, the hazard areas must be clearly marked by a combination of warning signs (such as “Danger – Swing/Crush Zone”) and high visibility markings on the equipment that identify the hazard areas. In addition, the employer must train each employee to understand what these markings signify.

(3) Protecting employees in the hazard area.

(i) Before an employee goes to a location in the hazard area that is out of view of the operator, the employee (or someone instructed by the employee) must ensure that the operator is informed that he/she is going to that location.

(ii) Where the operator knows that an employee went to a location covered by paragraph (a)(1) of this section, the operator must not rotate the

App. 202

superstructure until the operator is informed in accordance with a prearranged system of communication that the employee is in a safe position.

(b) Where any part of a crane/derrick is within the working radius of another crane/derrick, the controlling entity must institute a system to coordinate operations. If there is no controlling entity, the employer (if there is only one employer operating the multiple pieces of equipment), or employers, must institute such a system.

**§ 1926.1425 Keeping clear of the load.**

(a) Where available, hoisting routes that minimize the exposure of employees to hoisted loads must be used, to the extent consistent with public safety.

(b) While the operator is not moving a suspended load, no employee must be within the fall zone, except for employees:

(1) Engaged in hooking, unhooking or guiding a load;

(2) Engaged in the initial attachment of the load to a component or structure; or

(3) Operating a concrete hopper or concrete bucket.

(c) When employees are engaged in hooking, unhooking, or guiding the load, or in the initial connection of a load to a component or structure and

App. 203

are within the fall zone, all of the following criteria must be met:

- (1) The materials being hoisted must be rigged to prevent unintentional displacement.
  - (2) Hooks with self-closing latches or their equivalent must be used. *Exception*: “J” hooks are permitted to be used for setting wooden trusses.
  - (3) The materials must be rigged by a qualified rigger.
- (d) Receiving a load. Only employees needed to receive a load are permitted to be within the fall zone when a load is being landed.
- (e) During a tilt-up or tilt-down operation:
- (1) No employee must be directly under the load.
  - (2) Only employees essential to the operation are permitted in the fall zone (but not directly under the load). An employee is essential to the operation if the employee is conducting one of the following operations and the employer can demonstrate it is infeasible for the employee to perform that operation from outside the fall zone: (1) physically guide the load; (2) closely monitor and give instructions regarding the load’s movement; or (3) either detach it from or initially attach it to another component or structure (such as, but not limited to, making an initial connection or installing bracing).

NOTE: Boom free fall is prohibited when an employee is in the fall zone of the boom or load, and load line free fall is prohibited when an employee is directly under the load; see § 1926.1426.

**§ 1926.1426 Free fall and controlled load lowering.**

(a) *Boom free fall prohibitions.*

(1) The use of equipment in which the boom is designed to free fall (live boom) is prohibited in each of the following circumstances:

- (i) An employee is in the fall zone of the boom or load.
- (ii) An employee is being hoisted.
- (iii) The load or boom is directly over a power line, or over any part of the area extending the Table A of § 1926.1408 clearance distance to each side of the power line; or any part of the area extending the Table A clearance distance to each side of the power line is within the radius of vertical travel of the boom or the load.
- (iv) The load is over a shaft, except where there are no employees in the shaft.

App. 205

(v) The load is over a cofferdam, except where there are no employees in the fall zone of the boom or the load.

(vi) Lifting operations are taking place in a refinery or tank farm.

(2) The use of equipment in which the boom is designed to free fall (live boom) is permitted only where none of the circumstances listed in paragraph (a)(1) of this section are present and:

(i) The equipment was manufactured prior to October 31, 1984; or

(ii) The equipment is a floating crane/derrick or a land crane/derrick on a vessel/flotation device.

(b) Preventing boom free fall. Where the use of equipment with a boom that is designed to free fall (live boom) is prohibited, the boom hoist must have a secondary mechanism or device designed to prevent the boom from falling in the event the primary system used to hold or regulate the boom hoist fails, as follows:

(1) Friction drums must have:

(i) A friction clutch and, in addition, a braking device, to allow for controlled boom lowering.

(ii) A secondary braking or locking device, which is manually or automatically engaged, to back-up the primary brake

App. 206

while the boom is held (such as a secondary friction brake or a ratchet and pawl device).

(2) Hydraulic drums must have an integrally mounted holding device or internal static brake to prevent boom hoist movement in the event of hydraulic failure.

(3) Neither clutches nor hydraulic motors must be considered brake or locking devices for purposes of this subpart.

(4) Hydraulic boom cylinders must have an integrally mounted holding device.

(c) Preventing uncontrolled retraction. Hydraulic telescoping booms must have an integrally mounted holding device to prevent the boom from retracting in the event of hydraulic failure.

(d) Load line free fall. In each of the following circumstances, controlled load lowering is required and free fall of the load line hoist is prohibited:

(1) An employee is directly under the load.

(2) An employee is being hoisted.

(3) The load is directly over a power line, or over any part of the area extending the Table A of § 1926.1408 clearance distance to each side of the power line; or any part of the area extending the Table A of § 1926.1408 clearance distance to

each side of the power line is within the radius of vertical travel of the load.

(4) The load is over a shaft.

(5) The load is over a cofferdam, except where there are no employees in the fall zone of the load.

**§ 1926.1427 Operator qualification and certification.**

(a) The employer must ensure that, prior to operating any equipment covered under subpart CC, the person is operating the equipment during a training period in accordance with paragraph (f) of this section, or the operator is qualified or certified to operate the equipment in accordance with the following:

(1) When a non-military government entity issues operator licenses for equipment covered under subpart CC, and that government licensing program meets the requirements of paragraphs (e)(2) and (j) of this section, the equipment operator must either be:

- (i) licensed by that government entity for operation of equipment within that entity's jurisdiction; or
- (ii) qualified in compliance with paragraph (d) of this section.

(2) Where paragraph (a)(1) of this section is not applicable, the certification or qualification must

comply with one of the options in paragraphs (b) through (d) of this section.

(3) Exceptions: Operator qualification or certification under this section is not required for operators of derricks (see § 1926.1436), sideboom cranes (see § 1926.1440), or equipment with a maximum manufacturer-rated hoisting/lifting capacity of 2,000 pounds or less (see § 1926.1441).

(4) Whenever operator qualification or certification is required under § 1926.1427, the employer must provide the qualification or certification at no cost to operators who are employed by the employer on [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Option (1): Certification by an accredited crane operator testing organization.

(1) For a testing organization to be considered accredited to certify operators under this subpart, it must:

(i) Be accredited by a nationally recognized accrediting agency based on that agency's determination that industry recognized criteria for written testing materials, practical examinations, test administration, grading, facilities/equipment and personnel have been met.



App. 209

(ii) Administer written and practical tests that:

(A) Assess the operator applicant regarding, at a minimum, the knowledge and skills listed in paragraphs (j)(1) and (2) of this section.

(B) Provide different levels of certification based on equipment capacity and type.

(iii) Have procedures for operators to re-apply and be re-tested in the event an operator applicant fails a test or is decertified.

(iv) Have testing procedures for re-certification designed to ensure that the operator continues to meet the technical knowledge and skills requirements in paragraphs (j)(1) and (2) of this section.

(v) Have its accreditation reviewed by the nationally recognized accrediting agency at least every three years.

(2) An operator will be deemed qualified to operate a particular piece of equipment if the operator is certified under paragraph (b) of this section for that type and capacity of equipment or for higher-capacity equipment of that type. If no accredited testing agency offers certification examinations for a particular type and/or

capacity of equipment, an operator will be deemed qualified to operate that equipment if the operator has been certified for the type/capacity that is most similar to that equipment and for which a certification examination is available. The operator's certificate must state the type/capacity of equipment for which the operator is certified.

(3) A certification issued under this option is portable and meets the requirements of paragraph (a)(2) of this section.

(4) A certification issued under this paragraph is valid for 5 years.

(c) Option (2): Qualification by an audited employer program. The employer's qualification of its employee must meet the following requirements:

(1) The written and practical tests must be either:

(i) Developed by an accredited crane operator testing organization (see paragraph (b) of this section); or

(ii) Approved by an auditor in accordance with the following requirements:

(A) The auditor is certified to evaluate such tests by an accredited crane operator testing organization (see paragraph (b) of this section).

App. 211

(B) The auditor is not an employee of the employer.

(C) The approval must be based on the auditor's determination that the written and practical tests meet nationally recognized test development criteria and are valid and reliable in assessing the operator applicants regarding, at a minimum, the knowledge and skills listed in paragraphs (j)(1) and (2) of this section.

(D) The audit must be conducted in accordance with nationally recognized auditing standards.

(2) *Administration of tests.*

(i) The written and practical tests must be administered under circumstances approved by the auditor as meeting nationally recognized test administration standards.

(ii) The auditor must be certified to evaluate the administration of the written and practical tests by an accredited crane operator testing organization (see paragraph (b) of this section).

(iii) The auditor must not be an employee of the employer.

App. 212

(iv) The audit must be conducted in accordance with nationally recognized auditing standards.

(3) The employer program must be audited within 3 months of the beginning of the program and at least every 3 years thereafter.

(4) The employer program must have testing procedures for re-qualification designed to ensure that the operator continues to meet the technical knowledge and skills requirements in paragraphs (j)(1) and (2) of this section. The requalification procedures must be audited in accordance with paragraphs (c)(1) and (2) of this section.

(5) Deficiencies. If the auditor determines that there is a significant deficiency (“deficiency”) in the program, the employer must ensure that:

(i) No operator is qualified until the auditor confirms that the deficiency has been corrected.

(ii) The program is audited again within 180 days of the confirmation that the deficiency was corrected.

(iii) The auditor files a documented report of the deficiency to the appropriate Regional Office of the Occupational Safety and Health Administration within 15 days of the auditor’s determination that there is a deficiency.

App. 213

(iv) Records of the audits of the employer's program are maintained by the auditor for three years and are made available by the auditor to the Secretary of Labor or the Secretary's designated representative upon request.

(6) A qualification under this paragraph is:

(i) Not portable. Such a qualification meets the requirements of paragraph (a) of this section only where the operator is employed by (and operating the equipment for) the employer that issued the qualification.

(ii) Valid for 5 years.

(d) Option (3): Qualification by the U.S. military.

(1) For purposes of this section, an operator who is an employee of the U.S. military is considered qualified if he/she has a current operator qualification issued by the U.S. military for operation of the equipment. An employee of the U.S. military is a federal employee of the Department of Defense or Armed Forces and does not include employees of private contractors.

(2) A qualification under this paragraph is:

(i) Not portable. Such a qualification meets the requirements of paragraph (a) of this section only where the operator is

employed by (and operating the equipment for) the employer that issued the qualification.

(ii) Valid for the period of time stipulated by the issuing entity.

(e) Option (4): Licensing by a government entity.

(1) For purposes of this section, a government licensing department/office that issues operator licenses for operating equipment covered by this standard is considered a government accredited crane operator testing organization if the criteria in paragraph (e)(2) of this section are met.

(2) Licensing criteria.

(i) The requirements for obtaining the license include an assessment, by written and practical tests, of the operator applicant regarding, at a minimum, the knowledge and skills listed in paragraphs (j)(1) and (2) of this section.

(ii) The testing meets industry recognized criteria for written testing materials, practical examinations, test administration, grading, facilities/equipment and personnel.

(iii) The government authority that oversees the licensing department/office, has determined that the requirements in

App. 215

paragraphs (e)(2)(i) and (ii) of this section have been met.

(iv) The licensing department/office has testing procedures for relicensing designed to ensure that the operator continues to meet the technical knowledge and skills requirements in paragraphs (j)(1) and (2) of this section.

(3) A license issued by a government accredited crane operator testing organization that meets the requirements of this option:

(i) Meets the operator qualification requirements of this section for operation of equipment only within the jurisdiction of the government entity.

(ii) Is valid for the period of time stipulated by the licensing department/office, but no longer than 5 years.

(f) Pre-qualification/certification training period.  
An employee who is not qualified or certified under this section is permitted to operate equipment only as an operator-in-training and only where the requirements of this paragraph are met.

(1) The employer must provide each operator-in-training with sufficient training prior to operating the equipment to enable the operator-in-training to operate the equipment safely under limitations established by this section

(including continuous monitoring) and any additional limitations established by the employer.

(2) The tasks performed by the operator-in-training while operating the equipment must be within the operator-in-training's ability.

(3) Trainer. While operating the equipment, the operator-in-training must be continuously monitored by an individual ("operator's trainer") who meets all of the following requirements:

(i) The operator's trainer is an employee or agent of the operator-in-training's employer.

(ii) The operator's trainer is either a certified operator under this section, or has passed the written portion of a certification test under one of the options in paragraphs (b) through (e) of this section, and is familiar with the proper use of the equipment's controls.

(iii) While monitoring the operator-in-training, the operator's trainer performs no tasks that detract from the trainer's ability to monitor the operator-in-training.

(iv) For equipment other than tower cranes: the operator's trainer and the operator-in-training must be in direct line of sight of each other. In addition, they



must communicate verbally or by hand signals. For tower cranes: the operator's trainer and the operator-in-training must be in direct communication with each other.

(4) Continuous monitoring. The operator-in-training must be monitored by the operator's trainer at all times, except for short breaks where all of the following are met:

- (i) The break lasts no longer than 15 minutes and there is no more than one break per hour.
- (ii) Immediately prior to the break the operator's trainer informs the operator-in-training of the specific tasks that the operator-in-training is to perform and limitations to which he/she must adhere during the operator trainer's break.
- (iii) The specific tasks that the operator-in-training will perform during the operator trainer's break are within the operator-in-training's abilities.

(5) The operator-in-training must not operate the equipment in any of the following circumstances unless the exception stated in paragraph (f)(5)(v) of this section is applicable:

- (i) If any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the

App. 218

equipment's maximum working radius in the work zone (see § 1926.1408(a)(1)), could get within 20 feet of a power line that is up to 350 kV, or within 50 feet of a power line that is over 350 kV.

(ii) If the equipment is used to hoist personnel.

(iii) In multiple-equipment lifts.

(iv) If the equipment is used over a shaft, cofferdam, or in a tank farm.

(v) In multiple-lift rigging operations, except where the operator's trainer determines that the operator-in-training skills are sufficient for this high-skill work.

(g) Under this section, a testing entity is permitted to provide training as well as testing services as long as the criteria of the applicable accrediting agency (in the option selected) for an organization providing both services are met.

(h) *Language and Literacy Requirements.*

(1) Tests under this section may be administered verbally, with answers given verbally, where the operator candidate:

(i) Passes a written demonstration of literacy relevant to the work.

App. 219

- (ii) Demonstrates the ability to use the type of written manufacturer procedures applicable to the class/type of equipment for which the candidate is seeking certification.

(2) Tests under this section may be administered in any language the operator candidate understands, and the operator's certificate must note the language in which the test was given. The operator is qualified under paragraph (b)(2) of this section to operate equipment that is furnished with materials required by this subpart that are written in the language of the certification. The operator may only operate equipment furnished with such materials.

- (i) [Reserved.]

- (j) Certification criteria. Qualifications and certifications must be based, at a minimum, on the following:

(1) A determination through a written test that:

- (i) The individual knows the information necessary for safe operation of the specific type of equipment the individual will operate, including all of the following:

(A) The controls and operational/performance characteristics.

App. 220

(B) Use of, and the ability to calculate (manually or with a calculator), load/capacity information on a variety of configurations of the equipment.

(C) Procedures for preventing and responding to power line contact.

(D) Technical knowledge similar to the subject matter criteria listed in Appendix C of this subpart applicable to the specific type of equipment the individual will operate. Use of the Appendix C criteria meets the requirements of this provision.

(E) Technical knowledge applicable to:

(1) The suitability of the supporting ground and surface to handle expected loads.

(2) Site hazards.

(3) Site access.

(F) This subpart, including applicable incorporated materials.

(ii) The individual is able to read and locate relevant information in the equipment manual and other materials containing information referred to in paragraph (j)(1)(i) of this section.

App. 221

(2) A determination through a practical test that the individual has the skills necessary for safe operation of the equipment, including the following:

- (i) Ability to recognize, from visual and auditory observation, the items listed in § 1926.1412(d) (shift inspection).
- (ii) Operational and maneuvering skills.
- (iii) Application of load chart information.
- (iv) Application of safe shut-down and securing procedures.

(k) Phase-in.

(1) The provisions of this section are applicable [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER], except for paragraphs (a)(2) and (f) which are applicable [INSERT DATE 4 YEARS AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(2) When § 1926.1427(a)(1) is not applicable, all of the requirements in paragraphs (k)(2)(i) and (ii) of this section apply until [INSERT DATE 4 YEARS AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]:

(i) The employer must ensure that operators of equipment covered by this standard are competent to operate the equipment safely.

(ii) Where an employee assigned to operate machinery does not have the required knowledge or ability to operate the equipment safely, the employer must train that employee prior to operating the equipment. The employer must ensure that each operator is evaluated to confirm that he/she understands the information provided in the training.

**§ 1926.1428 Signal person qualifications.**

(a) The employer of the signal person must ensure that each signal person meets the Qualification Requirements (paragraph (c) of this section) prior to giving any signals. This requirement must be met by using either Option (1) or Option (2) of this section.

(1) Option (1) – Third party qualified evaluator.  
The signal person has documentation from a third party qualified evaluator (see Qualified Evaluator (third party), § 1926.1401 for definition) showing that the signal person meets the Qualification Requirements (see paragraph (c) of this section).

(2) Option (2) – Employer's qualified evaluator.  
The employer's qualified (see Qualified Evaluator (not a third party), § 1926.1401 for definition) evaluator assesses the individual and

determines that the individual meets the Qualification Requirements (see paragraph (c) of this section) and provides documentation of that determination. An assessment by an employer's qualified evaluator under this option is not portable – other employers are not permitted to use it to meet the requirements of this section.

(3) The employer must make the documentation for whichever option is used available at the site while the signal person is employed by the employer. The documentation must specify each type of signaling (e.g. hand signals, radio signals, etc.) for which the signal person meets the requirements of paragraph (c) of this section.

(b) If subsequent actions by the signal person indicate that the individual does not meet the Qualification Requirements (see paragraph (c) of this section), the employer must not allow the individual to continue working as a signal person until re-training is provided and a re-assessment is made in accordance with paragraph (a) of this section that confirms that the individual meets the Qualification Requirements.

(c) Qualification Requirements. Each signal person must:

(1) Know and understand the type of signals used. If hand signals are used, the signal person must know and understand the Standard Method for hand signals.

(2) Be competent in the application of the type of signals used.

(3) Have a basic understanding of equipment operation and limitations, including the crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads.

(4) Know and understand the relevant requirements of § 1926.1419 through § 1926.1422 and § 1926.1428.

(5) Demonstrate that he/she meets the requirements in paragraphs (c)(1) through (4) of this section through an oral or written test, and through a practical test.

**§ 1926.1429 Qualifications of maintenance & repair employees.**

(a) Maintenance, inspection and repair personnel are permitted to operate the equipment only where all of the following requirements are met:

(1) The operation is limited to those functions necessary to perform maintenance, inspect the equipment, or verify its performance.

(2) The personnel either:

(i) Operate the equipment under the direct supervision of an operator who meets the requirements of § 1926.1427 (Operator qualification and certification);  
or



- (ii) Are familiar with the operation, limitations, characteristics and hazards associated with the type of equipment.

(b) Maintenance and repair personnel must meet the definition of a qualified person with respect to the equipment and maintenance/repair tasks performed.

**§ 1926.1430 Training.**

The employer must provide training as follows:

(a) Overhead powerlines. The employer must train each employee specified in § 1926.1408(g) and § 1926.1410(m) in the topics listed in § 1926.1408(g).

(b) Signal persons. The employer must train each employee who will be assigned to work as a signal persons who does not meet the requirements of § 1926.1428(c) in the areas addressed in that paragraph.

(c) Operators.

(1) Operators-in-Training for equipment where certification or qualification is required by this subpart. The employer must train each operator-in-training in the areas addressed in § 1926.1427(j). The employer must provide re-training if the operator-in-training does not pass a qualification or certification test.

(2) Transitional Period. During the four-year phase-in period for operator certification or qualification, as provided in § 1926.1427(k),

App. 226

employers must train each operator who has not yet been certified or qualified in the areas addressed in § 1926.1427(j).

(3) Operators excepted from the requirements of § 1926.1427. The employer must train each operator excepted under § 1926.1427(a) from the requirements of § 1926.1427 on the safe operation of the equipment the operator will be using.

(4) The employer must train each operator of the equipment covered by this subpart in the following practices:

(i) On friction equipment, whenever moving a boom off a support, first raise the boom a short distance (sufficient to take the load of the boom) to determine if the boom hoist brake needs to be adjusted. On other types of equipment with a boom, the same practice is applicable, except that typically there is no means of adjusting the brake; if the brake does not hold, a repair is necessary. See § 1926.1417(f) and (j) for additional requirements.

(ii) Where available, the manufacturer's emergency procedures for halting unintended equipment movement.

(d) Competent persons and qualified persons. The employer must train each competent person and each

qualified person regarding the requirements of this subpart applicable to their respective roles.

(e) Crush/pinch points. The employer must train each employee who works with the equipment to keep clear of holes, and crush/pinch points and the hazards addressed in § 1926.1424 (Work area control).

(f) Tag-out. The employer must train each operator and each additional employee authorized to start/energize equipment or operate equipment controls (such as maintenance and repair employees), in the tag-out and start-up procedures in §§ 1926.1417(f) and (g).

(g) Training administration.

(1) The employer must evaluate each employee required to be trained under this subpart to confirm that the employee understands the information provided in the training.

(2) The employer must provide refresher training in relevant topics for each employee when, based on the conduct of the employee or an evaluation of the employee's knowledge, there is an indication that retraining is necessary.

(3) Whenever training is required under subpart CC, the employer must provide the training at no cost to the employee.

**§ 1926.1431 Hoisting personnel.**

The requirements of this section are supplemental to the other requirements in this subpart and apply when one or more employees are hoisted.

(a) The use of equipment to hoist employees is prohibited except where the employer demonstrates that the erection, use, and dismantling of conventional means of reaching the work area, such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform, or scaffold, would be more hazardous, or is not possible because of the project's structural design or worksite conditions. This paragraph does not apply to work covered by subpart R (Steel Erection) of this part.

(b) Use of personnel platform.

(1) When using equipment to hoist employees, the employees must be in a personnel platform that meets the requirements of paragraph (e) of this section.

(2) Exceptions: A personnel platform is not required for hoisting employees:

(i) Into and out of drill shafts that are up to and including 8 feet in diameter (see paragraph (o) of this section for requirements for hoisting these employees).

(ii) In pile driving operations (see paragraph (p) of this section for

requirements for hoisting these employees).

(iii) Solely for transfer to or from a marine worksite in a marine-hoisted personnel transfer device (see paragraph (r) of this section for requirements for hoisting these employees).

(iv) In storage-tank (steel or concrete), shaft and chimney operations (see paragraph (s) of this section for requirements for hoisting these employees).

(c) Equipment set-up.

(1) The equipment must be uniformly level, within one percent of level grade, and located on footing that a qualified person has determined to be sufficiently firm and stable.

(2) Equipment with outriggers or stabilizers must have them all extended and locked. The amount of extension must be the same for all outriggers and stabilizers and in accordance with manufacturer procedures and load charts.

(d) Equipment criteria.

(1) Capacity: use of suspended personnel platforms. The total load (with the platform loaded, including the hook, load line and rigging) must not exceed 50 percent of the rated capacity

for the radius and configuration of the equipment, except during proof testing.

(2) Capacity: use of boom-attached personnel platforms. The total weight of the loaded personnel platform must not exceed 50 percent of the rated capacity for the radius and configuration of the equipment (except during proof testing).

(3) Capacity: hoisting personnel without a personnel platform. When hoisting personnel without a personnel platform pursuant to paragraph (b)(2) of this section, the total load (including the hook, load line, rigging and any other equipment that imposes a load) must not exceed 50 percent of the rated capacity for the radius and configuration of the equipment, except during proof testing.

(4) When the occupied personnel platform is in a stationary working position, the load and boom hoist brakes, swing brakes, and operator actuated secondary braking and locking features (such as pawls or dogs) or automatic secondary brakes must be engaged.

(5) Devices.

(i) Equipment (except for derricks and articulating cranes) with a variable angle boom must be equipped with all of the following:

App. 231

(A) A boom angle indicator, readily visible to the operator, and

(B) A boom hoist limiting device.

(ii) Articulating cranes must be equipped with a properly functioning automatic overload protection device.

(iii) Equipment with a luffing jib must be equipped with:

(A) A jib angle indicator, readily visible to the operator, and.

(B) A jib hoist limiting device.

(iv) Equipment with telescoping booms must be equipped with a device to indicate the boom's extended length clearly to the operator, or must have measuring marks on the boom.

(v) Anti two-block. A device which automatically prevents damage and load failure from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component) must be used. The device(s) must prevent such damage/failure at all points where two-blocking could occur. Exception: this device is not required when hoisting personnel in pile driving operations. Instead, paragraph (p)(2) of this section

specifies how to prevent two-blocking during such operations.

(vi) Controlled load lowering. The load line hoist drum must have a system, other than the load line hoist brake, which regulates the lowering rate of speed of the hoist mechanism. This system or device must be used when hoisting personnel.

(NOTE: Free fall of the load line hoist is prohibited (see § 1926.1426(d); the use of equipment in which the boom hoist mechanism can free fall is also prohibited (see § 1926.1426(a)(1).)

(vii) Proper operation required. Personnel hoisting operations must not begin unless the devices listed in this section are in proper working order. If a device stops working properly during such operations, the operator must safely stop operations. Personnel hoisting operations must not resume until the device is again working properly. Alternative measures are not permitted. (See § 1926.1417 for tag-out and related requirements.)

(6) Direct attachment of a personnel platform to a luffing jib is prohibited.



(e) Personnel platform criteria.

(1) A qualified person familiar with structural design must design the personnel platform and attachment/suspension system used for hoisting personnel.

(2) The system used to connect the personnel platform to the equipment must allow the platform to remain within 10 degrees of level, regardless of boom angle.

(3) The suspension system must be designed to minimize tipping of the platform due to movement of employees occupying the platform.

(4) The personnel platform itself (excluding the guardrail system and personal fall arrest system anchorages), must be capable of supporting, without failure, its own weight and at least five times the maximum intended load.

(5) All welding of the personnel platform and its components must be performed by a certified welder familiar with the weld grades, types and material specified in the platform design.

(6) The personnel platform must be equipped with a guardrail system which meets the requirements of subpart M of this part, and must be enclosed at least from the toeboard to mid-rail with either solid construction material or expanded metal having openings no greater than ½ inch (1.27cm). Points to which personal fall arrest systems are attached must meet the

App. 234

anchorage requirements in subpart M of this part.

(7) A grab rail must be installed inside the entire perimeter of the personnel platform except for access gates/doors.

(8) Access gates/doors. If installed, access gates/doors of all types (including swinging, sliding, folding, or other types) must:

(i) Not swing outward. If due to the size of the personnel platform, such as a 1-person platform, it is infeasible for the door to swing inward and allow safe entry for the platform occupant, then the access gate/door may swing outward.

(ii) Be equipped with a device that prevents accidental opening.

(9) Headroom must be sufficient to allow employees to stand upright in the platform.

(10) In addition to the use of hard hats, employees must be protected by overhead protection on the personnel platform when employees are exposed to falling objects. The platform overhead protection must not obscure the view of the operator or platform occupants (such as wire mesh that has up to ½ inch openings), unless full protection is necessary.

(11) All edges exposed to employee contact must be smooth enough to prevent injury.

(12) The weight of the platform and its rated capacity must be conspicuously posted on the platform with a plate or other permanent marking.

(f) Personnel platform loading.

(1) The personnel platform must not be loaded in excess of its rated capacity.

(2) Use.

(i) Personnel platforms must be used only for employees, their tools, and the materials necessary to do their work. Platforms must not be used to hoist materials or tools when not hoisting personnel.

(ii) Exception: materials and tools to be used during the lift, if secured and distributed in accordance with paragraph (f)(3) of this section may be in the platform for trial lifts.

(3) Materials and tools must be:

(i) Secured to prevent displacement.

(ii) Evenly distributed within the confines of the platform while it is suspended.

(4) The number of employees occupying the personnel platform must not exceed the

App. 236

maximum number the platform was designed to hold or the number required to perform the work, whichever is less.

(g) Attachment and rigging.

(1) Hooks and other detachable devices.

(i) Hooks used in the connection between the hoist line and the personnel platform (including hooks on overhaul ball assemblies, lower load blocks, bridle legs, or other attachment assemblies or components) must be:

(A) Of a type that can be closed and locked, eliminating the throat opening.

(B) Closed and locked when attached.

(ii) Shackles used in place of hooks must be of the alloy anchor type, with either:

(A) A bolt, nut and retaining pin, in place; or

(B) Of the screw type, with the screw pin secured from accidental removal.

(iii) Where other detachable devices are used, they must be of the type that can be closed and locked to the same extent as the devices addressed in paragraphs (g)(1)(i) and (ii) of this section. Such

App. 237

devices must be closed and locked when attached.

(2) Rope bridle. When a rope bridle is used to suspend the personnel platform, each bridle leg must be connected to a master link or shackle (see paragraph (g)(1) of this section) in a manner that ensures that the load is evenly divided among the bridle legs.

(3) Rigging hardware (including wire rope, shackles, rings, master links, and other rigging hardware) and hooks must be capable of supporting, without failure, at least five times the maximum intended load applied or transmitted to that component. Where rotation resistant rope is used, the slings must be capable of supporting without failure at least ten times the maximum intended load.

(4) Eyes in wire rope slings must be fabricated with thimbles.

(5) Bridles and associated rigging for suspending the personnel platform must be used only for the platform and the necessary employees, their tools and materials necessary to do their work. The bridles and associated rigging must not have been used for any purpose other than hoisting personnel.

(h) Trial lift and inspection.

(1) A trial lift with the unoccupied personnel platform loaded at least to the anticipated

liftweight must be made from ground level, or any other location where employees will enter the platform, to each location at which the platform is to be hoisted and positioned. Where there is more than one location to be reached from a single set-up position, either individual trial lifts for each location, or a single trial lift, in which the platform is moved sequentially to each location, must be performed; the method selected must be the same as the method that will be used to hoist the personnel.

(2) The trial lift must be performed immediately prior to each shift in which personnel will be hoisted. In addition, the trial lift must be repeated prior to hoisting employees in each of the following circumstances:

- (i) The equipment is moved and set up in a new location or returned to a previously used location.
- (ii) The lift route is changed, unless the competent person determines that the new route presents no new factors affecting safety.

(3) The competent person must determine that:

- (i) Safety devices and operational aids required by this section are activated and functioning properly. Other safety devices and operational aids must meet the requirements of § 1926.1415 and § 1926.1416.

App. 239

(ii) Nothing interferes with the equipment or the personnel platform in the course of the trial lift.

(iii) The lift will not exceed 50 percent of the equipment's rated capacity at any time during the lift.

(iv) The load radius to be used during the lift has been accurately determined.

(4) Immediately after the trial lift, the competent person must:

(i) Conduct a visual inspection of the equipment, base support or ground, and personnel platform, to determine whether the trial lift has exposed any defect or problem or produced any adverse effect.

(ii) Confirm that, upon the completion of the trial lift process, the test weight has been removed.

(5) Immediately prior to each lift:

(i) The platform must be hoisted a few inches with the personnel and materials/tools on board and inspected by a competent person to ensure that it is secure and properly balanced.

(ii) The following conditions must be determined by a competent person to exist before the lift of personnel proceeds:

App. 240

(A) Hoist ropes must be free of deficiencies in accordance with § 1926.1413(a).

(B) Multiple part lines must not be twisted around each other.

(C) The primary attachment must be centered over the platform.

(D) If the load rope is slack, the hoisting system must be inspected to ensure that all ropes are properly seated on drums and in sheaves.

(6) Any condition found during the trial lift and subsequent inspection(s) that fails to meet a requirement of this standard or otherwise creates a safety hazard must be corrected before hoisting personnel. (See § 1926.1417 for tag-out and related requirements.)

(i) [Reserved.]

(j) Proof testing.

(1) At each jobsite, prior to hoisting employees on the personnel platform, and after any repair or modification, the platform and rigging must be proof tested to 125 percent of the platform's rated capacity. The proof test may be done concurrently with the trial lift.

(2) The platform must be lowered by controlled load lowering, braked, and held in a suspended



position for a minimum of five minutes with the test load evenly distributed on the platform.

(3) After proof testing, a competent person must inspect the platform and rigging to determine if the test has been passed. If any deficiencies are found that pose a safety hazard, the platform and rigging must not be used to hoist personnel unless the deficiencies are corrected, the test is repeated, and a competent person determines that the test has been passed. (See § 1926.1417 for tag-out and related requirements.)

(4) Personnel hoisting must not be conducted until the competent person determines that the platform and rigging have successfully passed the proof test.

(k) Work practices.

(1) Hoisting of the personnel platform must be performed in a slow, controlled, cautious manner, with no sudden movements of the equipment or the platform.

(2) Platform occupants must:

(i) Keep all parts of the body inside the platform during raising, lowering, and horizontal movement. This provision does not apply to an occupant of the platform when necessary to position the platform or while performing the duties of a signal person.

(ii) Not stand, sit on, or work from the top or intermediate rail or toeboard, or use any other means/device to raise their working height.

(iii) Not pull the platform out of plumb in relation to the hoisting equipment.

(3) Before employees exit or enter a hoisted personnel platform that is not landed, the platform must be secured to the structure where the work is to be performed, unless the employer can demonstrate that securing to the structure would create a greater hazard.

(4) If the platform is tied to the structure, the operator must not move the platform until the operator receives confirmation that it is freely suspended.

(5) Tag lines must be used when necessary to control the platform.

(6) Platforms without controls. Where the platform is not equipped with controls, the equipment operator must remain at the equipment controls, on site, and in view of the equipment, at all times while the platform is occupied.

(7) Platforms with controls. Where the platform is equipped with controls, all of the following must be met at all times while the platform is occupied:

(i) The occupant using the controls in the platform must be a qualified person with respect to their use, including the safe limitations of the equipment and hazards associated with its operation.

(ii) The equipment operator must be at a set of equipment controls that include boom and swing functions of the equipment, and must be on site and in view of the equipment.

(iii) The platform operating manual must be in the platform or on the equipment.

(8) Environmental conditions.

(i) Wind. When wind speed (sustained or gusts) exceeds 20 mph at the personnel platform, a qualified person must determine if, in light of the wind conditions, it is not safe to lift personnel. If it is not, the lifting operation must not begin (or, if already in progress, must be terminated).

(ii) Other weather and environmental conditions. A qualified person must determine if, in light of indications of dangerous weather conditions, or other impending or existing danger, it is not safe to lift personnel. If it is not, the lifting operation must not begin (or, if already in progress, must be terminated).

(9) Employees being hoisted must remain in direct communication with the signal person (where used), or the operator.

(10) Fall protection.

(i) Except over water, employees occupying the personnel platform must be provided and use a personal fall arrest system. The system must be attached to a structural member within the personnel platform. When working over or near water, the requirements of § 1926.106 apply.

(ii) The fall arrest system, including the attachment point (anchorage) used to comply with paragraph (i) of this section, must meet the requirements in § 1926.502.

(11) Other load lines.

(i) No lifts must be made on any other of the equipment's load lines while personnel are being hoisted, except in pile driving operations.

(ii) Factory-produced boom-mounted personnel platforms that incorporate a winch as original equipment. Loads are permitted to be hoisted by such a winch while employees occupy the personnel platform only where the load on the winch line does not exceed 500 pounds and does

App. 245

not exceed the rated capacity of the winch and platform.

(12) Traveling – equipment other than derricks.

(i) Hoisting of employees while the equipment is traveling is prohibited, except for:

(A) Equipment that travels on fixed rails; or

(B) Where the employer demonstrates that there is no less hazardous way to perform the work.

(C) This exception does not apply to rubber-tired equipment.

(ii) Where employees are hoisted while the equipment is traveling, all of the following criteria must be met:

(A) Equipment travel must be restricted to a fixed track or runway.

(B) Where a runway is used, it must be a firm, level surface designed, prepared and designated as a path of travel for the weight and configuration of the equipment being used to lift and travel with the personnel platform. An existing surface may be used as long as it meets these criteria.

App. 246

(C) Equipment travel must be limited to boom length.

(D) The boom must be parallel to the direction of travel, except where it is safer to do otherwise.

(E) A complete trial run must be performed to test the route of travel before employees are allowed to occupy the platform. This trial run can be performed at the same time as the trial lift required by paragraph (h) of this section which tests the lift route.

(13) Traveling – derricks. Derricks are prohibited from traveling while personnel are hoisted.

(l) [Reserved.]

(m) Pre-lift meeting. A pre-lift meeting must be:

(1) Held to review the applicable requirements of this section and the procedures that will be followed.

(2) Attended by the equipment operator, signal person (if used for the lift), employees to be hoisted, and the person responsible for the task to be performed.

(3) Held prior to the trial lift at each new work location, and must be repeated for any employees newly assigned to the operation.

(n) Hoisting personnel near power lines. Hoisting personnel within 20 feet of a power line that is up to 350 kV, and hoisting personnel within 50 feet of a power line that is over 350 kV, is prohibited, except for work covered by subpart V of this part (Power Transmission and Distribution).

(o) Hoisting personnel in drill shafts. When hoisting employees into and out of drill shafts that are up to and including 8 feet in diameter, all of the following requirements must be met:

(1) The employee must be in either a personnel platform or on a boatswain's chair.

(2) If using a personnel platform, paragraphs (a) through (n) of this section apply.

(3) If using a boatswain's chair:

(i) The following paragraphs of this section apply: (a), (c), (d)(1), (d)(3), (d)(4), (e)(1), (e)(2), (e)(3), (f)(1), (f)(2)(i), (f)(3)(i), (g), (h), (k)(1), (k)(6), (k)(8), (k)(9), (k)(11)(i), (m), (n). Where the terms "personnel platform" or "platform" are used in these paragraphs, substitute them with "boatswain's chair."

(ii) A signal person must be stationed at the shaft opening.

(iii) The employee must be hoisted in a slow, controlled descent and ascent.

App. 248

(iv) The employee must use personal fall protection equipment, including a full body harness, attached independent of the crane/derrick.

(v) The fall protection equipment must meet the applicable requirements in § 1926.502.

(vi) The boatswain's chair itself (excluding the personal fall arrest system anchorages), must be capable of supporting, without failure, its own weight and at least five times the maximum intended load. (vii) No more than one person must be hoisted at a time.

(p) Hoisting personnel for pile driving operations. When hoisting an employee in pile driving operations, the following requirements must be met:

(1) The employee must be in a personnel platform or boatswain's chair.

(2) For lattice boom cranes: Clearly mark the cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, or use a spotter who is in direct communication with the operator to inform the operator when this point is reached. For telescopic boom cranes: Clearly mark the cable (so that it can be easily seen by the operator) at a point that will give the operator sufficient time



App. 249

to stop the hoist to prevent two-blocking, and use a spotter who is in direct communication with the operator to inform the operator when this point is reached.

(3) If using a personnel platform, paragraphs (b) through (n) of this section apply.

(4) If using a boatswain's chair:

(i) The following paragraphs of this section apply: (a), (c), (d)(1), (d)(3), (d)(4), (e)(1), (e)(2), (e)(3), (f)(1), (f)(2)(i), (f)(3)(i), (g), (h), (j), (k)(1), (k)(6), (k)(8), (k)(9), (k)(11)(i), (m), and (n). Where the terms "personnel platform" or "platform" are used in these paragraphs, substitute them with "boatswains chair."

(ii) The employee must be hoisted in a slow, controlled descent and ascent.

(iii) The employee must use personal fall protection equipment, including a full body harness, independently attached to the lower load block or overhaul ball.

(iv) The fall protection equipment must meet the applicable requirements in § 1926.502.

(v) The boatswain's chair itself (excluding the personal fall arrest system anchorages), must be capable of supporting, without failure, its own

App. 250

weight and at least five times the maximum intended load.

(vi) No more than one person must be hoisted at a time.

(q) [Reserved.]

(r) Hoisting personnel for marine transfer. When hoisting employees solely for transfer to or from a marine worksite, the following requirements must be met:

(1) The employee must be in either a personnel platform or a marine-hoisted personnel transfer device.

(2) If using a personnel platform, paragraphs (a) through (n) of this section apply.

(3) If using a marine-hoisted personnel transfer device:

(i) The following paragraphs of this section apply: (a), (c)(2), (d)(1), (d)(3), (d)(4), (e)(1) through (5), (e)(12), (f)(1), (g), (h), (j), (k)(1), (k)(8), (k)(9), (k)(10)(ii), (k)(11)(i), (k)(12), (m), and (n). Where the terms “personnel platform” or “platform” are used in these paragraphs, substitute them with “marine-hoisted personnel transfer device.”

(ii) The transfer device must be used only for transferring workers.

App. 251

(iii) The number of workers occupying the transfer device must not exceed the maximum number it was designed to hold.

(iv) Each employee must wear a U.S. Coast Guard personal flotation device approved for industrial use.

(s) Hoisting personnel for storage-tank (steel or concrete), shaft and chimney operations. When hoisting an employee in storage tank (steel or concrete), shaft and chimney operations, the following requirements must be met:

(1) The employee must be in a personnel platform except when the employer can demonstrate that use of a personnel platform is infeasible; in such a case, a boatswain's chair must be used.

(2) If using a personnel platform, paragraphs (a) through (n) of this section apply.

(3) If using a boatswain's chair:

(i) The following paragraphs of this section apply: (a), (c), (d)(1), (d)(3), (d)(4), (e)(1), (e)(2), (e)(3), (f)(1), (f)(2)(i), (f)(3)(i), (g), (h), (k)(1), (k)(6), (k)(8), (k)(9), (k)(11)(i), (m), (n). Where the terms "personnel platform" or "platform" are used in these paragraphs, substitute them with "boatswain's chair."

App. 252

(ii) The employee must be hoisted in a slow, controlled descent and ascent.

(iii) The employee must use personal fall protection equipment, including a full body harness, attached independent of the crane/derrick. When there is no adequate structure for attachment of personal fall arrest equipment as required in § 1926.502(d)(15), the attachment must be to the lower load block or overhaul ball.

(iv) fall protection equipment must meet the applicable requirements in § 1926.502.

(v) The boatswain's chair itself (excluding the personal fall arrest system anchorages), must be capable of supporting, without failure, its own weight and at least five times the maximum intended load.

(vi) No more than one person must be hoisted at a time.

**§ 1926.1432 Multiple-crane/derrick lifts -- supplemental requirements.**

(a) *Plan development.* Before beginning a crane/derrick operation in which more than one crane/derrick will be supporting the load, the operation must be planned. The planning must meet the following requirements:

App. 253

(1) The plan must be developed by a qualified person.

(2) The plan must be designed to ensure that the requirements of this subpart are met.

(3) Where the qualified person determines that engineering expertise is needed for the planning, the employer must ensure that it is provided.

(b) Plan implementation.

(1) The multiple-crane/derrick lift must be directed by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons (lift director).

(2) The lift director must review the plan in a meeting with all workers who will be involved with the operation.

**§ 1926.1433 Design, construction and testing.**

The following requirements apply to equipment that has a manufacturer-rated hoisting/lifting capacity of more than 2,000 pounds.

(a) Crawler, truck and locomotive cranes manufactured prior to [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] must meet the applicable requirements for design, construction, and testing as prescribed in ANSI B30.5-1968 (incorporated by reference, see § 1926.6),

PCSA Std. No. 2 (1968) (incorporated by reference, see § 1926.6), the requirements in paragraph

(b) of this section, or the applicable DIN standards that were in effect at the time of manufacture. (b) Mobile (including crawler and truck) and locomotive cranes manufactured on or after [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] must meet the following portions of ASME B30.5-2004 (incorporated by reference, see § 1926.6) as applicable:

- (1) In section 5-1.1.1 (“Load Ratings – Where Stability Governs Lifting Performance”), paragraphs (a) – (d) (including subparagraphs).
- (2) In section 5-1.1.2 (“Load Ratings – Where Structural Competence Governs Lifting Performance”), paragraph (b).
- (3) Section 5-1.2 (“Stability (Backward and Forward)”).
- (4) In section 5-1.3.1 (“Boom Hoist Mechanism”), paragraphs (a), (b)(1) and (b)(2), except that when using rotation resistant rope, § 1926.1414(c)(4)(ii)(A) applies.
- (5) In section 5-1.3.2 (“Load Hoist Mechanism”), paragraphs (a)(2) through (a)(4) (including subparagraphs), (b) (including subparagraphs), (c) (first sentence only) and (d).
- (6) Section 5-1.3.3 (“Telescoping Boom”).

App. 255

- (7) Section 5-1.4 (“Swing Mechanism”).
  - (8) In section 5-1.5 (“Crane Travel”), all provisions except 5-1.5.3(d).
  - (9) In section 5-1.6 (“Controls”), all provisions except 5-1.6.1 (c).
  - (10) Section 5-1.7.4 (“Sheaves”).
  - (11) Section 5-1.7.5 (“Sheave sizes”).
  - (12) In section 5-1.9.1 (“Booms”), paragraph (f).
  - (13) Section 5-1.9.3 (“Outriggers”).
  - (14) Section 5-1.9.4 (“Locomotive Crane Equipment”).
  - (15) Section 5-1.9.7 (“Clutch and Brake Protection”).
  - (16) In section 5-1.9.11 (“Miscellaneous equipment”), paragraphs (a), (c), (e), and (f).
- (c) Prototype testing: mobile (including crawler and truck) and locomotive cranes manufactured on or after [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] must meet the prototype testing requirements in Test Option A or Test Option B of this section. Tower cranes manufactured on or after [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] must meet the prototype testing

requirements in BS EN 14439:2006 (incorporated by reference, see § 1926.6).

NOTE: Prototype testing of crawler, locomotive and truck cranes manufactured prior to [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] must conform to paragraph (a) of this section.

(1) Test Option A.

(i) The following applies to equipment with cantilevered booms (such as hydraulic boom cranes): All the tests listed in SAE J1063 (Nov. 1993) Table 1 (incorporated by reference, see § 1926.6) must be performed to load all critical structural elements to their respective limits. All the strength margins listed in SAE J1063 (Nov. 1993) Table 2 (incorporated by reference, see § 1926.6) must be met.

(ii) The following applies to equipment with pendant supported lattice booms: All the tests listed in SAE J987 (Jun. 2003) Table 1 (incorporated by reference, see § 1926.6) must be performed to load all critical structural elements to their respective limits. All the strength margins listed in SAE J987 (Jun. 2003) Table 2 (incorporated by reference, see § 1926.6) must be met.



(2) Test Option B. The testing and verification requirements of BS EN 13000:2004 (incorporated by reference, see § 1926.6) must be met. In applying BS EN 13000:2004, the following additional requirements must be met:

(i) The following applies to equipment with cantilevered booms (such as hydraulic boom cranes): The analysis methodology (computer modeling) must demonstrate that all load cases listed in SAE J1063 (Nov. 1993) (incorporated by reference, see § 1926.6) meet the strength margins listed in SAE J1063 (Nov. 1993) Table 2.

(ii) The following applies to equipment with pendant supported lattice booms: The analysis methodology (computer modeling) must demonstrate that all load cases listed in SAE J987 (Jun. 2003) (incorporated by reference, see § 1926.6) meet the strength margins listed in SAE J987 (Jun. 2003) Table 2.

(iii) Analysis verification. The physical testing requirements under SAE J1063 (Nov. 1993) (incorporated by reference, see § 1926.6) and SAE J987 (Jun. 2003) (incorporated by reference, see § 1926.6) must be met unless the reliability of the analysis methodology (computer modeling) has been demonstrated by a documented history of verification through strain gauge measuring or strain

App. 258

gauge measuring in combination with other physical testing.

(d) All equipment covered by this subpart must meet the following requirements:

(1) *Rated capacity and related information.* The information available in the cab (see § 1926.1417(c)) regarding “rated capacity” and related information must include, at a minimum, the following information:

(i) A complete range of the manufacturer’s equipment rated capacities, as follows:

(A) At all manufacturer approved operating radii, boom angles, work areas, boom lengths and configurations, jib lengths and angles (or offset).

(B) Alternate ratings for use and nonuse of option equipment which affects rated capacities, such as outriggers, stabilizers, and extra counterweights.

(ii) A work area chart for which capacities are listed in the load chart. (Note: an example of this type of chart is in ASME B30.5-2004, section 5-1.1.3, Figure 11).

App. 259

- (iii) The work area figure and load chart must clearly indicate the areas where no load is to be handled.
- (iv) Recommended reeving for the hoist lines must be shown.
- (v) Recommended parts of hoist reeving, size, and type of wire rope for various equipment loads.
- (vi) Recommended boom hoist reeving diagram, where applicable; size, type and length of wire rope.
- (vii) Tire pressure (where applicable).
- (viii) Caution or warnings relative to limitations on equipment and operating procedures, including an indication of the least stable direction.
- (ix) Position of the gantry and requirements for intermediate boom suspension (where applicable).
- (x) Instructions for boom erection and conditions under which the boom, or boom and jib combinations, may be raised or lowered.
- (xi) Whether the hoist holding mechanism is automatically or manually controlled, whether free fall is available, or any combination of these.

App. 260

(xii) The maximum telescopic travel length of each boom telescopic section.

(xiii) Whether sections are telescoped manually or with power.

(xiv) The sequence and procedure for extending and retracting the telescopic boom section.

(xv) Maximum loads permitted during the boom extending operation, and any limiting conditions or cautions.

(xvi) Hydraulic relief valve settings specified by the manufacturer.

(2) Load hooks (including latched and unlatched types), ball assemblies and load blocks must be of sufficient weight to overhaul the line from the highest hook position for boom or boom and jib lengths and the number of parts of the line in use.

(3) Hook and ball assemblies and load blocks must be marked with their rated capacity and weight.

(4) Latching hooks.

(i) Hooks must be equipped with latches, except where the requirements of paragraph (d)(4)(ii) of this section are met.

App. 261

(ii) Hooks without latches, or with latches removed or disabled, must not be used unless:

(A) A qualified person has determined that it is safer to hoist and place the load without latches (or with the latches removed/tiedback).

(B) Routes for the loads are pre-planned to ensure that no employee is required to work in the fall zone except for employees necessary for the hooking or unhooking of the load.

(iii) The latch must close the throat opening and be designed to retain slings or other lifting devices/accessories in the hook when the rigging apparatus is slack.

(5) Posted warnings. Posted warnings required by this subpart as well as those originally supplied with the equipment by the manufacturer must be maintained in legible condition.

(6) An accessible fire extinguisher must be on the equipment.

(7) Cabs. Equipment with cabs must meet the following requirements:

(i) Cabs must be designed with a form of adjustable ventilation and method for clearing the windshield for maintaining

visibility and air circulation. Examples of means for adjustable ventilation include air conditioner or window that can be opened (for ventilation and air circulation); examples of means for maintaining visibility include heater (for preventing windshield icing), defroster, fan, windshield wiper.

(ii) Cab doors (swinging, sliding) must be designed to prevent inadvertent opening or closing while traveling or operating the machine. Swinging doors adjacent to the operator must open outward. Sliding operator doors must open rearward.

(iii) Windows.

(A) The cab must have windows in front and on both sides of the operator. Forward vertical visibility must be sufficient to give the operator a view of the boom point at all times.

(B) Windows may have sections designed to be opened or readily removed. Windows with sections designed to be opened must be designed so that they can be secured to prevent inadvertent closure.

(C) Windows must be of safety glass or material with similar optical and safety properties, that introduce no

App. 263

visible distortion or otherwise obscure visibility that interferes with the safe operation of the equipment.

(iv) A clear passageway must be provided from the operator's station to an exit door on the operator's side.

(v) Areas of the cab roof that serve as a workstation for rigging, maintenance or other equipment-related tasks must be capable of supporting 250 pounds without permanent distortion.

(8) Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, and other parts or components that reciprocate, rotate or otherwise move must be guarded where contact by employees (except for maintenance and repair employees) is possible in the performance of normal duties.

(9) All exhaust pipes, turbochargers, and charge air coolers must be insulated or guarded where contact by employees (except for maintenance and repair employees) is possible in the performance of normal duties.

(10) Hydraulic and pneumatic lines must be protected from damage to the extent feasible.

(11) The equipment must be designed so that exhaust fumes are not discharged in the cab and are discharged in a direction away from the operator.

(12) Friction mechanisms. Where friction mechanisms (such as brakes and clutches) are used to control the boom hoist or load line hoist, they must be:

(i) Of a size and thermal capacity sufficient to control all rated loads with the minimum recommended reeving.

(ii) Adjustable to permit compensation for lining wear to maintain proper operation.

(13) Hydraulic load hoists. Hydraulic drums must have an integrally mounted holding device or internal static brake to prevent load hoist movement in the event of hydraulic failure.

(e) The employer's obligations under paragraphs (a) through (c) and (d)(7) through (13) of this section are met where the equipment has not changed (except in accordance with § 1926.1434 (Equipment modifications)) and it can refer to documentation from the manufacturer showing that the equipment has been designed, constructed and tested in accordance with those paragraphs.

**§ 1926.1434 Equipment modifications.**

(a) Modifications or additions which affect the capacity or safe operation of the equipment are prohibited except where the requirements of paragraphs (a)(1), (a)(2), (a)(3), (a)(4), or (a)(5) of this section are met.

(1) Manufacturer review and approval.



App. 265

- (i) The manufacturer approves the modifications/additions in writing.
- (ii) The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.
- (iii) The original safety factor of the equipment is not reduced.

(2) Manufacturer refusal to review request. The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/ addition, but it declines to review the technical merits of the proposal or fails, within 30 days, to acknowledge the request or initiate the review, and all of the following are met:

- (i) A registered professional engineer who is a qualified person with respect to the equipment involved:
  - (A) Approves the modification/ addition and specifies the equipment configurations to which that approval applies, and
  - (B) Modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/addition.

- (ii) The original safety factor of the equipment is not reduced.

(3) Unavailable manufacturer. The manufacturer is unavailable and the requirements of paragraphs (a)(2)(i) and (ii) of this section are met.

(4) Manufacturer does not complete the review within 120 days of the request. The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/ addition, agrees to review the technical merits of the proposal, but fails to complete the review of the proposal within 120 days of the date it was provided the detailed description of the proposed modification/addition, and the requirements of paragraphs (a)(2)(i) and (ii) of this section are met.

(5) Multiple manufacturers of equipment designed for use on marine work sites. The equipment is designed for marine work sites, contains major structural components from more than one manufacturer, and the requirements of paragraphs (a)(2)(i) and (ii) of this section are met.

- (b) Modifications or additions which affect the capacity or safe operation of the equipment are prohibited where the manufacturer, after a review of the technical safety merits of the proposed modification/addition, rejects the proposal and explains the reasons for the rejection in a written response. If

the manufacturer rejects the proposal but does not explain the reasons for the rejection in writing, the employer may treat this as a manufacturer refusal to review the request under paragraph (a)(2) of this section.

(c) The provisions in paragraphs (a) and (b) of this section do not apply to modifications made or approved by the U.S. military.

**§ 1926.1435 Tower cranes.**

(a) This section contains supplemental requirements for tower cranes; all sections of this subpart apply to tower cranes unless specified otherwise.

(b) *Erecting, climbing and dismantling.*

(1) Section 1926.1403 (Assembly/Disassembly – selection of manufacturer or employer procedures), § 1926.1404 (Assembly/Disassembly – general requirements (applies to all assembly and disassembly operations)), § 1926.1405 (Disassembly – additional requirements for dismantling of booms and jibs (applies to both the use of manufacturer procedures and employer procedures)), and § 1926.1406 (Assembly/Disassembly – employer procedures - general requirements), apply to tower cranes (except as otherwise specified), except that the term “assembly/ disassembly” is replaced by “erecting, climbing and dismantling,” and the term “disassembly” is replaced by “dismantling.”

(2) Dangerous areas (self-erecting tower cranes).

In addition to the requirements in § 1926.1404(e), for self-erecting tower cranes, the following applies: Employees must not be in or under the tower, jib, or rotating portion of the crane during erecting, climbing and dismantling operations until the crane is secured in a locked position and the competent person in charge indicates it is safe to enter this area, unless the manufacturer's instructions direct otherwise and only the necessary personnel are permitted in this area.

(3) Foundations and structural supports. Tower crane foundations and structural supports (including both the portions of the structure used for support and the means of attachment) must be designed by the manufacturer or a registered professional engineer.

(4) Addressing specific hazards. The requirements in § 1926.1404(h)(1) through (9) apply. In addition, the A/D director must address the following:

(i) Foundations and structural supports. The A/D director must determine that tower crane foundations and structural supports are installed in accordance with their design.

(ii) Loss of backward stability. Backward stability before swinging self erecting cranes or cranes on traveling or static undercarriages.

(iii) Wind speed. Wind must not exceed the speed recommended by the manufacturer or, where manufacturer does not specify this information, the speed determined by a qualified person.

(5) Plumb tolerance. Towers must be erected plumb to the manufacturer's tolerance and verified by a qualified person. Where the manufacturer does not specify plumb tolerance, the crane tower must be plumb to a tolerance of at least 1:500 (approximately 1 inch in 40 feet).

(6) Multiple tower crane jobsites. On jobsites where more than one fixed jib (hammerhead) tower crane is installed, the cranes must be located such that no crane can come in contact with the structure of another crane. Cranes are permitted to pass over one another.

(7) Climbing procedures. Prior to, and during, all climbing procedures (including inside climbing and top climbing), the employer must:

(i) Comply with all manufacturer prohibitions.

(ii) Have a registered professional engineer verify that the host structure is strong enough to sustain the forces imposed through the braces, brace anchorages and supporting floors.

(8) Counterweight / ballast.

(i) Equipment must not be erected, dismantled or operated without the amount and position of counterweight and/or ballast in place as specified by the manufacturer or a registered professional engineer familiar with the equipment.

(ii) The maximum counterweight and/or ballast specified by the manufacturer or registered professional engineer familiar with the equipment must not be exceeded.

(c) Signs. The size and location of signs installed on tower cranes must be in accordance with manufacturer specifications. Where these are unavailable, a registered professional engineer familiar with the type of equipment involved must approve in writing the size and location of any signs.

(d) Safety devices.

(1) Section 1926.1415 does not apply to tower cranes.

(2) The following safety devices are required on all tower cranes unless otherwise specified:

(i) Boom stops on luffing boom type tower cranes.

App. 271

(ii) Jib stops on luffing boom type tower cranes if equipped with a jib attachment.

(iii) Travel rail end stops at both ends of travel rail.

(iv) Travel rail clamps on all travel bogies.

(v) Integrally mounted check valves on all load supporting hydraulic cylinders.

(vi) Hydraulic system pressure limiting device. (vii) The following brakes, which must automatically set in the event of pressure loss or power failure, are required:

(A) A hoist brake on all hoists.

(B) Swing brake.

(C) Trolley brake.

(D) Rail travel brake.

(viii) Deadman control or forced neutral return control (hand) levers.

(ix) Emergency stop switch at the operator's station.

(x) Trolley end stops must be provided at both ends of travel of the trolley.

(3) Proper operation required. Operations must not begin unless the devices listed in this section are in proper working order. If a device stops working properly during operations, the operator must safely stop operations. The equipment must be taken out of service, and operations must not resume until the device is again working properly. See § 1926.1417(f). Alternative measures are not permitted to be used.

(e) Operational aids.

(1) Section 1926.1416 does not apply to tower cranes.

(2) The devices listed in this section (“operational aids”) are required on all tower cranes covered by this subpart, unless otherwise specified.

(3) Operations must not begin unless the operational aids are in proper working order, except where the employer meets the specified temporary alternative measures. More protective alternative measures specified by the tower crane manufacturer, if any, must be followed. See § 1926.1417(j) for additional requirements.

(4) If an operational aid stops working properly during operations, the operator must safely stop operations until the temporary alternative measures are implemented or the device is again working properly. If a replacement part is no



longer available, the use of a substitute device that performs the same type of function is permitted and is not considered a modification under § 1926.1434.

(5) Category I operational aids and alternative measures. Operational aids listed in this paragraph that are not working properly must be repaired no later than 7 calendar days after the deficiency occurs. Exception: If the employer documents that it has ordered the necessary parts within 7 calendar days of the occurrence of the deficiency, the repair must be completed within 7 calendar days of receipt of the parts.

(i) Trolley travel limiting device. The travel of the trolley must be restricted at both ends of the jib by a trolley travel limiting device to prevent the trolley from running into the trolley end stops.  
Temporary alternative measures:

(A) Option A. The trolley rope must be marked (so it can be seen by the operator) at a point that will give the operator sufficient time to stop the trolley prior to the end stops.

(B) Option B. A spotter who is in direct communication with the operator must be used when operations are conducted within 10 feet of the outer or inner trolley end stops.

(ii) Boom hoist limiting device. The range of the boom must be limited at the minimum and maximum radius. Temporary alternative measures: Clearly mark the cable (so it can be seen by the operator) at a point that will give the operator sufficient time to stop the boom hoist within the minimum and maximum boom radius, or use a spotter who is in direct communication with the operator to inform the operator when this point is reached.

(iii) Anti two-blocking device. The tower crane must be equipped with a device which automatically prevents damage from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device(s) must prevent such damage at all points where two-blocking could occur. Temporary alternative measures: Clearly mark the cable (so it can be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, or use a spotter who is in direct communication with the operator to inform the operator when this point is reached.

(iv) Hoist drum lower limiting device. Tower cranes manufactured after [INSERT DATE 1 YEAR AND 90 DAYS AFTER DATE OF PUBLICATION IN

THE FEDERAL REGISTER] must be equipped with a device that prevents the last 2 wraps of hoist cable from being spooled off the drum. Temporary alternative measures: Mark the cable (so it can be seen by the operator) at a point that will give the operator sufficient time to stop the hoist prior to last 2 wraps of hoist cable being spooled off the drum, or use a spotter who is in direct communication with the operator to inform the operator when this point is reached

(v) Load moment limiting device. The tower crane must have a device that prevents moment overloading. Temporary alternative measures: A radius indicating device must be used (if the tower crane is not equipped with a radius indicating device, the radius must be measured to ensure the load is within the rated capacity of the crane). In addition, the weight of the load must be determined from a source recognized by the industry (such as the load's manufacturer), or by a calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight), or by other equally reliable means. This information must be provided to the operator prior to the lift.

(vi) Hoist line pull limiting device. The capacity of the hoist must be limited to

prevent overloading, including each individual gear ratio if equipped with a multiple speed hoist transmission.

Temporary alternative measures: The operator must ensure that the weight of the load does not exceed the capacity of the hoist (including for each individual gear ratio if equipped with a multiple speed hoist transmission).

(vii) Rail travel limiting device. The travel distance in each direction must be limited to prevent the travel bogies from running into the end stops or buffers.

Temporary alternative measures: A spotter who is in direct communication with the operator must be used when operations are conducted within 10 feet of either end of the travel rail end stops; the spotter must inform the operator of the distance of the travel bogies from the end stops or buffers.

(viii) Boom hoist drum positive locking device and control. The boom hoist drum must be equipped with a control that will enable the operator to positively lock the boom hoist drum from the cab. Temporary alternative measures: The device must be manually set when required if an electric, hydraulic or automatic control is not functioning.

(6) Category II operational aids and alternative measures. Operational aids listed in this

paragraph that are not working properly must be repaired no later than 30 calendar days after the deficiency occurs. Exception: If the employer documents that it has ordered the necessary parts within 7 calendar days of the occurrence of the deficiency, and the part is not received in time to complete the repair in 30 calendar days, the repair must be completed within 7 calendar days of receipt of the parts.

(i) Boom angle or hook radius indicator.

(A) Luffing boom tower cranes must have a boom angle indicator readable from the operator's station.

(B) Hammerhead tower cranes manufactured after [INSERT DATE 1 YEAR AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] must have a hook radius indicator readable from the operator's station.

(C) Temporary alternative measures: Hook radii or boom angle must be determined by measuring the hook radii or boom angle with a measuring device.

(ii) Trolley travel deceleration device. The trolley speed must be automatically reduced prior to the trolley reaching the end limit in both directions. Temporary

alternative measure: The employer must post a notice in the cab of the crane notifying the operator that the trolley travel deceleration device is malfunctioning and instructing the operator to take special care to reduce the trolley speed when approaching the trolley end limits.

(iii) Boom hoist deceleration device. The boom speed must be automatically reduced prior to the boom reaching the minimum or maximum radius limit. Temporary alternative measure: The employer must post a notice in the cab of the crane notifying the operator that the boom hoist deceleration device is malfunctioning and instructing the operator to take special care to reduce the boom speed when approaching the minimum or maximum radius limits.

(iv) Load hoist deceleration device. The load speed must be automatically reduced prior to the hoist reaching the upper limit. Temporary alternative measure: The employer must post a notice in the cab of the crane notifying the operator that the load hoist deceleration device is malfunctioning and instructing the operator to take special care to reduce the load speed when approaching the upper limits.

(v) Wind speed indicator. A device must be provided to display the wind speed and must be mounted above the upper rotating structure on tower cranes. On self erecting cranes, it must be mounted at or above the jib level. Temporary alternative measures: Use of wind speed information from a properly functioning indicating device on another tower crane on the same site, or a qualified person estimates the wind speed.

(vi) Load indicating device. Cranes manufactured after [INSERT DATE 1 YEAR AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] must have a device that displays the magnitude of the load on the hook. Displays that are part of load moment limiting devices that display the load on the hook meet this requirement. Temporary alternative measures: The weight of the load must be determined from a source recognized by the industry (such as the load's manufacturer), or by a calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight), or by other equally reliable means. This information must be provided to the operator prior to the lift.

(f) Inspections.

(1) Section 1926.1412 (Inspections) applies to tower cranes, except that the term “assembly” is replaced by “erection.” Section 1926.1413 (Wire rope – inspection) applies to tower cranes.

(2) Pre-erection inspection. Before each crane component is erected, it must be inspected by a qualified person for damage or excessive wear.

(i) The qualified person must pay particular attention to components that will be difficult to inspect thoroughly during shift inspections.

(ii) If the qualified person determines that a component is damaged or worn to the extent that it would create a safety hazard if used on the crane, that component must not be erected on the crane unless it is repaired and, upon reinspection by the qualified person, found to no longer create a safety hazard.

(iii) If the qualified person determines that, though not presently a safety hazard, the component needs to be monitored, the employer must ensure that the component is checked in the monthly inspections. Any such determination must be documented, and the documentation must be available to any individual who conducts a monthly inspection.



(3) Post-erection inspection. In addition to the requirements in § 1926.1412(c), the following requirements must be met:

- (i) A load test using certified weights, or scaled weights using a certified scale with a current certificate of calibration, must be conducted after each erection.
- (ii) The load test must be conducted in accordance with the manufacturer's instructions when available. Where these instructions are unavailable, the test must be conducted in accordance with written load test procedures developed by a registered professional engineer familiar with the type of equipment involved.

(4) Monthly. The following additional items must be included:

- (i) Tower (mast) bolts and other structural bolts (for loose or dislodged condition) from the base of the tower crane up or, if the crane is tied to or braced by the structure, those above the upper-most brace support.
- (ii) The upper-most tie-in, braces, floor supports and floor wedges where the tower crane is supported by the structure, for loose or dislodged components.

(5) Annual. In addition to the items that must be inspected under § 1926.1412(f), all turntable and tower bolts must be inspected for proper condition and torque.

**§ 1926.1436 Derricks.**

(a) This section contains supplemental requirements for derricks, whether temporarily or permanently mounted; all sections of this subpart apply to derricks unless specified otherwise. A derrick is powered equipment consisting of a mast or equivalent member that is held at or near the end by guys or braces, with or without a boom, and its hoisting mechanism. The mast/equivalent member and/or the load is moved by the hoisting mechanism (typically base-mounted) and operating ropes. Derricks include: A-frame, basket, breast, Chicago boom, gin pole (except gin poles used for erection of communication towers), guy, shearleg, stiffleg, and variations of such equipment.

(b) Operation – procedures.

(1) Section 1926.1417 (Operation) applies except for § 1926.1417(c) (Accessibility of procedures).

(2) Load chart contents. Load charts must contain at least the following information:

(i) Rated capacity at corresponding ranges of boom angle or operating radii.

(ii) Specific lengths of components to which the rated capacities apply.

- (iii) Required parts for hoist reeving.
- (iv) Size and construction of rope must be included on the load chart or in the operating manual.

(3) Load chart location.

- (i) Permanent installations. For permanently installed derricks with fixed lengths of boom, guy, and mast, a load chart must be posted where it is visible to personnel responsible for the operation of the equipment.
- (ii) Non-permanent installations. For derricks that are not permanently installed, the load chart must be readily available at the job site to personnel responsible for the operation of the equipment.

(c) Construction.

(1) General requirements.

- (i) Derricks must be constructed to meet all stresses imposed on members and components when installed and operated in accordance with the manufacturer's/ builder's procedures and within its rated capacity.
- (ii) Welding of load sustaining members must conform to recommended

practices in ANSI/AWS D14.3-94 (incorporated by reference, see § 1926.6) or AWS D1.1/D1.1M:2002 (incorporated by reference, see § 1926.6).

(2) Guy derricks.

(i) The minimum number of guys must be 6, with equal spacing, except where a qualified person or derrick manufacturer approves variations from these requirements and revises the rated capacity to compensate for such variations.

(ii) Guy derricks must not be used unless the employer has the following guy information from the manufacturer or a qualified person, when not available from the manufacturer:

(A) The number of guys.

(B) The spacing around the mast.

(C) The size, grade, and construction of rope to be used for each guy.

(iii) For guy derricks manufactured after December 18, 1970, in addition to the information required in paragraph (c)(2)(ii) of this section, the employer must have the following guy information from the manufacturer or a qualified person,

when not available from the manufacturer:

(A) The amount of initial sag or tension.

(B) The amount of tension in guy line rope at anchor.

(iv) The mast base must permit the mast to rotate freely with allowance for slight tilting of the mast caused by guy slack.

(v) The mast cap must:

(A) Permit the mast to rotate freely.

(B) Withstand tilting and cramping caused by the guy loads.

(C) Be secured to the mast to prevent disengagement during erection.

(D) Be provided with means for attaching guy ropes.

(3) Stiffleg derricks.

(i) The mast must be supported in the vertical position by at least two stifflegs; one end of each must be connected to the top of the mast and the other end securely anchored.

App. 286

(ii) The stifflegs must be capable of withstanding the loads imposed at any point of operation within the load chart range.

(iii) The mast base must:

(A) Permit the mast to rotate freely (when necessary).

(B) Permit deflection of the mast without binding.

(iv) The mast must be prevented from lifting out of its socket when the mast is in tension.

(v) The stiffleg connecting member at the top of the mast must:

(A) Permit the mast to rotate freely (when necessary).

(B) Withstand the loads imposed by the action of the stifflegs.

(C) Be secured so as to oppose separating forces.

(4) Gin pole derricks.

(i) Guy lines must be sized and spaced so as to make the gin pole stable in both boomed and vertical positions. Exception: Where the size and/or spacing of guy lines

App. 287

do not result in the gin pole being stable in both boomed and vertical positions, the employer must ensure that the derrick is not used in an unstable position.

(ii) The base of the gin pole must permit movement of the pole (when necessary).

(iii) The gin pole must be anchored at the base against horizontal forces (when such forces are present).

(5) Chicago boom derricks. The fittings for stepping the boom and for attaching the topping lift must be arranged to:

(i) Permit the derrick to swing at all permitted operating radii and mounting heights between fittings.

(ii) Accommodate attachment to the upright member of the host structure.

(iii) Withstand the forces applied when configured and operated in accordance with the manufacturer's/ builder's procedures and within its rated capacity.

(iv) Prevent the boom or topping lift from lifting out under tensile forces.

(d) Anchoring and guying.

(1) Load anchoring data developed by the manufacturer or a qualified person must be used.

(2) Guy derricks.

- (i) The mast base must be anchored.
- (ii) The guys must be secured to the ground or other firm anchorage.
- (iii) The anchorage and guying must be designed to withstand maximum horizontal and vertical forces encountered when operating within rated capacity with the particular guy slope and spacing specified for the application.

(3) Stiffleg derricks.

- (i) The mast base and stifflegs must be anchored.
- (ii) The mast base and stifflegs must be designed to withstand maximum horizontal and vertical forces encountered when operating within rated capacity with the particular stiffleg spacing and slope specified for the application.



(e) Swingers and hoists.

(1) The boom, swinger mechanisms and hoists must be suitable for the derrick work intended and must be anchored to prevent displacement from the imposed loads.

(2) Hoists.

(i) Base mounted drum hoists must meet the requirements in the following sections of ASME B30.7-2001 (incorporated by reference, see § 1926.6):

(A) Sections 7-1.1 (“Load ratings and markings”).

(B) Section 7-1.2 (“Construction”), except: 7-1.2.13 (“Operator’s cab”); 7-1.2.15 (“Fire extinguishers”).

(C) Section 7-1.3 (“Installation”).

(D) Applicable terms in section 7-0.2 (“Definitions”).

(ii) Load tests for new hoists. The employer must ensure that new hoists are load tested to a minimum of 110% of rated capacity, but not more than 125% of rated capacity, unless otherwise recommended by the manufacturer. This requirement is met where the manufacturer has conducted this testing.

(iii) Repaired or modified hoists. Hoists that have had repairs, modifications or additions affecting their capacity or safe operation must be evaluated by a qualified person to determine if a load test is necessary. If it is, load testing must be conducted in accordance with paragraphs (e)(2)(ii) and (iv) of this section.

(iv) Load test procedure. Load tests required by paragraphs (e)(2)(ii) or (e)(2)(iii) of this section must be conducted as follows:

(A) The test load must be hoisted a vertical distance to assure that the load is supported by the hoist and held by the hoist brake(s).

(B) The test load must be lowered, stopped and held with the brake(s).

(C) The hoist must not be used unless a competent person determines that the test has been passed.

(f) Operational aids.

(1) Section 1926.1416 (Operational aids) applies, except for § 1926.1416(d)(1) (Boom hoist limiting device), § 1926.1416(e)(1) (Boom angle or radius indicator), and § 1926.1416(e)(4) (Load weighing and similar devices).

(2) Boom angle aid. A boom angle indicator is not required but if the derrick is not equipped with a functioning one, the employer must ensure that either:

(i) The boom hoist cable must be marked with caution and stop marks. The stop marks must correspond to maximum and minimum allowable boom angles. The caution and stop marks must be in view of the operator, or a spotter who is in direct communication with the operator; or

(ii) An electronic or other device that signals the operator in time to prevent the boom from moving past its maximum and minimum angles, or automatically prevents such movement, is used.

(3) Load weight/capacity devices.

(i) Derricks manufactured more than one year after [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] with a maximum rated capacity over 6,000 pounds must have at least one of the following: load weighing device, load moment indicator, rated capacity indicator, or rated capacity limiter. Temporary alternative measures: The weight of the load must be determined from a source recognized by the industry (such as the load's manufacturer), or by a

App. 292

calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight), or by other equally reliable means. This information must be provided to the operator prior to the lift. See § 1926.1417(j) for additional requirements.

(ii) A load weight/capacity device that is not working properly must be repaired no later than 30 days after the deficiency occurs. Exception: If the employer documents that it has ordered the necessary parts within 7 days of the occurrence of the deficiency, and the part is not received in time to complete the repair in 30 days, the repair must be completed within 7 days of receipt of the parts.

(g) Post-assembly approval and testing – new or reinstalled derricks.

(1) Anchorage.

(i) Anchorages, including the structure to which the derrick is attached (if applicable), must be approved by a qualified person.

(ii) If using a rock or hairpin anchorage, the qualified person must determine if any special testing of the anchorage is

needed. If so, it must be tested accordingly.

(2) Functional test. Prior to initial use, new or reinstalled derricks must be tested by a competent person with no hook load to verify proper operation. This test must include:

- (i) Lifting and lowering the hook(s) through the full range of hook travel.
- (ii) Raising and lowering the boom through the full range of boom travel.
- (iii) Swinging in each direction through the full range of swing.
- (iv) Actuating the anti two-block and boom hoist limit devices (if provided).
- (v) Actuating locking, limiting and indicating devices (if provided).

(3) Load test. Prior to initial use, new or reinstalled derricks must be load tested by a competent person. The test load must meet the following requirements:

- (i) Test loads must be at least 100% and no more than 110% of the rated capacity, unless otherwise recommended by the manufacturer or qualified person, but in no event must the test load be less than the maximum anticipated load.

App. 294

(ii) The test must consist of:

(A) Hoisting the test load a few inches and holding to verify that the load is supported by the derrick and held by the hoist brake(s).

(B) Swinging the derrick, if applicable, the full range of its swing, at the maximum allowable working radius for the test load.

(C) Booming the derrick up and down within the allowable working radius for the test load.

(D) Lowering, stopping and holding the load with the brake(s).

(iii) The derrick must not be used unless the competent person determines that the test has been passed.

(4) Documentation. Tests conducted under this paragraph must be documented. The document must contain the date, test results and the name of the tester. The document must be retained until the derrick is re-tested or dismantled, whichever occurs first. All such documents must be available, during the applicable document retention period, to all persons who conduct inspections in accordance with § 1926.1412.

(h) Load testing repaired or modified derricks. Derricks that have had repairs, modifications or

additions affecting the derrick's capacity or safe operation must be evaluated by a qualified person to determine if a load test is necessary. If it is, load testing must be conducted and documented in accordance with paragraph (g) of this section.

(i) [Reserved.]

(j) Power failure procedures. If power fails during operations, the derrick operator must safely stop operations. This must include:

(1) Setting all brakes or locking devices.

(2) Moving all clutch and other power controls to the off position.

(k) Use of winch heads.

(1) Ropes must not be handled on a winch head without the knowledge of the operator.

(2) While a winch head is being used, the operator must be within reach of the power unit control lever.

(l) [Reserved.]

(m) Securing the boom.

(1) When the boom is being held in a fixed position, dogs, pawls, or other positive holding mechanisms on the boom hoist must be engaged.

App. 296

(2) When taken out of service for 30 days or more, the boom must be secured by one of the following methods:

- (i) Laid down.
- (ii) Secured to a stationary member, as nearly under the head as possible, by attachment of a sling to the load block.
- (iii) For guy derricks, lifted to a vertical position and secured to the mast.
- (iv) For stiffleg derricks, secured against the stiffleg.

(n) The process of jumping the derrick must be supervised by the A/D director.

(o) Derrick operations must be supervised by a competent person.

(p) Inspections. In addition to the requirements in § 1926.1412, the following additional items must be included in the inspections:

(1) Daily: Guys for proper tension.

(2) Annual.

- (i) Gudgeon pin for cracks, wear, and distortion.
- (ii) Foundation supports for continued ability to sustain the imposed loads.



(q) *Qualification and Training.* The employer must train each operator of a derrick on the safe operation of equipment the individual will operate. Section 1926.1427 of this subpart (Operator qualification and certification) does not apply.

**§ 1926.1437 Floating cranes/derricks and land cranes/derricks on barges.**

(a) This section contains supplemental requirements for floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation (i.e., vessel/flotation device). The sections of this subpart apply to floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation, unless specified otherwise. The requirements of this section do not apply when using jacked barges when the jacks are deployed to the river, lake, or sea bed and the barge is fully supported by the jacks.

(b) *General requirements.* The requirements in paragraphs (c) through (k) of this section apply to both floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation.

(c) *Work area control.*

(1) The requirements of § 1926.1424 (Work area control) apply, except for § 1926.1424(a)(2)(ii).

(2) The employer must either:

(i) Erect and maintain control lines, warning lines, railings or similar barriers

App. 298

to mark the boundaries of the hazard areas; or

(ii) Clearly mark the hazard areas by a combination of warning signs (such as, “Danger – Swing/Crush Zone”) and high visibility markings on the equipment that identify the hazard areas. In addition, the employer must train each employee to understand what these markings signify.

(d) Keeping clear of the load. Section 1926.1425 does not apply.

(e) Additional safety devices. In addition to the safety devices listed in § 1926.1415, the following safety devices are required:

(1) Barge, pontoon, vessel or other means of flotation list and trim device. The safety device must be located in the cab or, when there is no cab, at the operator’s station.

(2) Positive equipment house lock.

(3) Wind speed and direction indicator. A competent person must determine if wind is a factor that needs to be considered; if wind needs to be considered, a wind speed and direction indicator must be used.

(f) Operational aids.

(1) An anti two-block device is required only when hoisting personnel or hoisting over an occupied cofferdam or shaft.

(2) Section 1926.1416(e)(4) (Load weighing and similar devices) does not apply to dragline, clamshell (grapple), magnet, drop ball, container handling, concrete bucket, and pile driving work performed under this section.

(g) Accessibility of procedures applicable to equipment operation. If the crane/derrick has a cab, the requirements of § 1926.1417(c) apply. If the crane/derrick does not have a cab, the employer must ensure that:

(1) Rated capacities (load charts) are posted at the operator's station. If the operator's station is moveable (such as with pendant-controlled equipment), the load charts are posted on the equipment.

(2) Procedures applicable to the operation of the equipment (other than load charts), recommended operating speeds, special hazard warnings, instructions and operators manual, must be readily available on board the vessel/flotation device.

(h) Inspections. In addition to meeting the requirements of § 1926.1412 for inspecting the crane/derrick, the employer must inspect the barge, pontoons, vessel or other means of flotation used to

App. 300

support a floating crane/derrick or land crane/derrick, and ensure that:

(1) Shift. For each shift inspection, the means used to secure/attach the equipment to the vessel/flotation device is in proper condition, including wear, corrosion, loose or missing fasteners, defective welds, and (when applicable) insufficient tension.

(2) Monthly. For each monthly inspection:

(i) The means used to secure/attach the equipment to the vessel/flotation device is in proper condition, including inspection for wear, corrosion, and, when applicable, insufficient tension.

(ii) The vessel/flotation device is not taking on water.

(iii) The deckload is properly secured.

(iv) The vessel/flotation device is watertight based on the condition of the chain lockers, storage, fuel compartments, and hatches.

(v) The firefighting and lifesaving equipment is in place and functional.

(3) The shift and monthly inspections are conducted by a competent person, and:

App. 301

(i) If any deficiency is identified, an immediate determination is made by a qualified person whether the deficiency constitutes a hazard.

(ii) If the deficiency is determined to constitute a hazard, the vessel/flotation device is removed from service until the deficiency has been corrected.

(4) Annual: external vessel/flotation device inspection. For each annual inspection:

(i) The external portion of the barge, pontoons, vessel or other means of flotation used is inspected annually by a qualified person who has expertise with respect to vessels/flotation devices and that the inspection includes the following items:

(A) The items identified in paragraphs (h)(1) (*Shift*) and (h)(2) (*Monthly*) of this section.

(B) Cleats, bitts, chocks, fenders, capstans, ladders, and stanchions, for significant corrosion, wear, deterioration, or deformation that could impair the function of these items.

(C) External evidence of leaks and structural damage; evidence of leaks and damage below the waterline may

App. 302

be determined through internal inspection of the vessel/flotation device.

(D) Four-corner draft readings.

(E) Firefighting equipment for serviceability.

(ii) Rescue skiffs, lifelines, work vests, life preservers and ring buoys are inspected for proper condition.

(iii) If any deficiency is identified, an immediate determination is made by the qualified person whether the deficiency constitutes a hazard or, though not yet a hazard, needs to be monitored in the monthly inspections.

(A) If the qualified person determines that the deficiency constitutes a hazard, the vessel/flotation device is removed from service until it has been corrected. See requirements in § 1926.1417(f).

(B) If the qualified person determines that, though not presently a hazard, the deficiency needs to be monitored, the deficiency is checked in the monthly inspections.

(5) Four-year: internal vessel/flotation device inspection. For each four-year inspection:

App. 303

(i) A marine engineer, marine architect, licensed surveyor, or other qualified person who has expertise with respect to vessels/flotation devices surveys the internal portion of the barge, pontoons, vessel, or other means of flotation.

(ii) If the surveyor identifies a deficiency, an immediate determination is made by the surveyor as to whether the deficiency constitutes a hazard or, though not yet a hazard, needs to be monitored in the monthly or annual inspections, as appropriate.

(A) If the surveyor determines that the deficiency constitutes a hazard, the vessel/flotation device is removed from service until it has been corrected.

(B) If the surveyor determines that, though not presently a hazard, the deficiency needs to be monitored, the deficiency is checked in the monthly or annual inspections, as appropriate.

(6) *Documentation.* The monthly and annual inspections required in paragraphs (h)(2) and (h)(4) of this section are documented in accordance with §§ 1926.1412 (e)(3) and 1926.1412(f)(7), respectively, and that the four-year inspection required in paragraph (h)(5) of this section is documented in accordance with § 1926.1412(f)(7), except that the documentation

for that inspection must be retained for a minimum of 4 years. All such documents must be made available, during the applicable document retention period, to all persons who conduct inspections in accordance with § 1926.1412.

(i) [Reserved.]

(j) Working with a diver. The employer must meet the following additional requirements when working with a diver in the water:

(1) If a crane/derrick is used to get a diver into and out of the water, it must not be used for any other purpose until the diver is back on board. When used for more than one diver, it must not be used for any other purpose until all divers are back on board.

(2) The operator must remain at the controls of the crane/derrick at all times.

(3) In addition to the requirements in §§ 1926.1419 through 1926.1422 (Signals), either:

(i) A clear line of sight must be maintained between the operator and tender; or

(ii) The signals between the operator and tender must be transmitted electronically.



(4) The means used to secure the crane/derrick to the vessel/flotation device (see paragraph (n)(5) of this section) must not allow any amount of shifting in any direction.

(k) Manufacturer's specifications and limitations.

(1) The employer must ensure that the barge, pontoons, vessel, or other means of flotation must be capable of withstanding imposed environmental, operational and in-transit loads when used in accordance with the manufacturer's specifications and limitations.

(2) The employer must ensure that the manufacturer's specifications and limitations with respect to environmental, operational, and in-transit loads for a barge, pontoon, vessel, or other means of flotation are not exceeded or violated.

(3) When the manufacturer's specifications and limitations are unavailable, the employer must ensure that the specifications and limitations established by a qualified person with respect to environmental, operational and in-transit loads for the barge, pontoons, vessel, or other means of flotation are not exceeded or violated.

(l) [Reserved.]

(m) Floating cranes/derricks. For equipment designed by the manufacturer (or employer) for marine use by permanent attachment to barges, pontoons, vessels or other means of flotation:

(1) Load charts.

(i) The employer must not exceed the manufacturer load charts applicable to operations on water. When using these charts, the employer must comply with all parameters and limitations (such as dynamic and environmental parameters) applicable to the use of the charts.

(ii) The employer must ensure that load charts take into consideration a minimum wind speed of 40 miles per hour.

(2) The employer must ensure that the requirements for maximum allowable list and maximum allowable trim as specified in Table M1 of this section are met.

TABLE M1		
<i><u>Equipment designed for marine use by permanent attachment (other than derricks):</u></i>		
Rated Capacity	Maximum Allowable List	Maximum Allowable Trim
25 tons or less	5 degrees	5 degrees
Over 25 tons	7 degrees	7 degrees
<i><u>Derricks designed for marine use by permanent attachment:</u></i>		
Any rated capacity	10 degrees	10 degrees

(3) The employer must ensure that the equipment is stable under the conditions specified in Tables M2 and M3 of this section. (Note: Freeboard is the vertical distance between the water line and the main deck of the vessel.)

TABLE M2		
Operated at	Wind speed	Minimum freeboard
Rated capacity	60 mph	2 ft
Rated capacity plus 25%	60 mph	1 ft
High boom, no load	60 mph	2 ft

TABLE M3	
<i>For backward stability of the boom:</i>	
Operated at	Wind speed
High boom, no load, full back list (least stable condition)	90 mph

(4) If the equipment is employer-made, it must not be used unless the employer has documents demonstrating that the load charts and applicable parameters for use meet the requirements of paragraphs (m)(1) through (3) of this section. Such documents must be signed by a registered professional engineer who is a qualified person with respect to the design of this type of equipment (including the means of flotation).

App. 309

(5) The employer must ensure that the barge, pontoons, vessel or other means of flotation used:

(i) Are structurally sufficient to withstand the static and dynamic loads of the crane/derrick when operating at the crane/derrick's maximum rated capacity with all planned and actual deck loads and ballasted compartments.

(ii) Have a subdivided hull with one or more longitudinal watertight bulkheads for reducing the free-surface effect.

(iii) Have access to void compartments to allow for inspection and pumping.

(n) Land cranes/derricks. For land cranes/derricks used on barges, pontoons, vessels or other means of flotation, the employer must ensure that:

(1) The rated capacity of the equipment (including but not limited to modification of load charts) applicable for use on land is reduced to:

(i) Account for increased loading from list, trim, wave action, and wind.

(ii) Be applicable to a specified location(s) on the specific barge, pontoons, vessel or other means of flotation that will be used, under the environmental conditions expected and encountered.

App. 310

(iii) The conditions required in paragraphs (n)(3) and (n)(4) of this section are met.

(2) The rated capacity modification required in paragraph (n)(1) of this section is performed by the equipment manufacturer, or a qualified person who has expertise with respect to both land crane/derrick capacity and the stability of vessels/flotation devices.

(3) For list and trim.

(i) The maximum allowable list and the maximum allowable trim for the barge, pontoon, vessel or other means of flotation must not exceed the amount necessary to ensure that the conditions in paragraph (n)(4) of this section are met. In addition, the maximum allowable list and the maximum allowable trim does not exceed the least of the following: 5 degrees, the amount specified by the crane/derrick manufacturer, or, when, an amount is not so specified, the amount specified by the qualified person.

(ii) The maximum allowable list and the maximum allowable trim for the land crane/derrick does not exceed the amount specified by the crane/derrick manufacturer, or, when, an amount is not so specified, the amount specified by the qualified person.

App. 311

(4) For the following conditions:

(i) All deck surfaces of the barge, pontoons, vessel or other means of flotation used are above water.

(ii) The entire bottom area of the barge, pontoons, vessel or other means of flotation used is submerged.

(5) Physical attachment, corraling, rails system and centerline cable system meet the requirements in Option (1), Option (2), Option (3), or Option (4) of this section, and that whichever option is used also meets the requirements of paragraph (n)(5)(v) of this section.

(i) Option (1) – Physical attachment. The crane/derrick is physically attached to the barge, pontoons, vessel or other means of flotation. Methods of physical attachment include crossed-cable systems attached to the crane/derrick and vessel/flotation device, bolting or welding the crane/derrick to the vessel/flotation device, strapping the crane/derrick to the vessel/flotation device with chains, or other methods of physical attachment.

(ii) Option (2) – Corraling. The crane/derrick is prevented from shifting by installing barricade restraints (i.e., a corraling system). Employers must ensure that corraling systems do not

allow the equipment to shift by any amount of shifting in any direction.

(iii) Option (3) – Rails. The crane/derrick must be prevented from shifting by being mounted on a rail system. Employers must ensure that rail clamps and rail stops are used unless the system is designed to prevent movement during operation by other means.

(iv) Option (4) – Centerline cable system. The crane/derrick is prevented from shifting by being mounted to a wire rope system. The employer must ensure that the wire rope system meets the following requirements:

(A) The wire rope and attachments are of sufficient size and strength to support the side load of crane/derrick.

(B) The wire rope is attached physically to the vessel/flotation device.

(C) The wire rope is attached to the crane/derrick by appropriate attachment methods (such as shackles or sheaves) on the undercarriage, and that the method used will allow the crew to secure the crane/derrick from movement during operation and to move the crane/derrick longitudinally



App. 313

along the vessel/flotation device for repositioning.

(D) Means are installed to prevent the crane/derrick from passing the forward or aft end of the wire rope attachments.

(E) The crane/derrick is secured from movement during operation.

(v) The systems/means used to comply with Option (1), Option (2), Option (3), or Option (4) of this section are designed by a marine engineer, registered professional engineer familiar with floating crane/derrick design, or qualified person familiar with floating crane/derrick design.

(6) *Exception.* For mobile auxiliary cranes used on the deck of a floating crane/derrick, the requirement specified by paragraph (n)(5) of this section to use Option (1), Option (2), Option (3), or Option (4) does not apply when the employer demonstrates implementation of a plan and procedures that meet the following requirements:

(i) A marine engineer or registered professional engineer familiar with floating crane/derrick design develops and signs a written plan for the use of the mobile auxiliary crane.

App. 314

(ii) The plan is designed so that the applicable requirements of this section are met despite the position, travel, operation, and lack of physical attachment (or corralling, use of rails or cable system) of the mobile auxiliary crane.

(iii) The plan specifies the areas of the deck where the mobile auxiliary crane is permitted to be positioned, travel, and operate, and the parameters and limitations of such movements and operation.

(iv) The deck is marked to identify the permitted areas for positioning, travel, and operation.

(v) The plan specifies the dynamic and environmental conditions that must be present for use of the plan.

(vi) If the dynamic and environmental conditions in paragraph (n)(6)(v) of this section are exceeded, the mobile auxiliary crane is attached physically or corralled in accordance with Option (1), Option (2) or Option (4) of paragraph (n)(5) of this section.

(7) The barge, pontoons, vessel or other means of flotation used:

- (i) Are structurally sufficient to withstand the static and dynamic loads of the crane/derrick when operating at the crane/derrick's maximum rated capacity with all anticipated deck loads and ballasted compartments.
- (ii) Have a subdivided hull with one or more longitudinal watertight bulkheads for reducing the free surface effect.
- (iii) Have access to void compartments to allow for inspection and pumping.

**§ 1926.1438 Overhead & gantry cranes.**

- (a) Permanently installed overhead and gantry cranes. The requirements of § 1910.179, except for § 1910.179(b)(1), and not the requirements of this subpart CC, apply to the following equipment when used in construction and permanently installed in a facility: overhead and gantry cranes, including semigantry, cantilever gantry, wall cranes, storage bridge cranes, and others having the same fundamental characteristics.
- (b) Overhead and gantry cranes that are not permanently installed in a facility.

(1) This paragraph applies to the following equipment when used in construction and not permanently installed in a facility: overhead and gantry cranes, overhead/bridge cranes, semigantry, cantilever gantry, wall cranes, storage bridge cranes, launching gantry cranes,

App. 316

and similar equipment having the same fundamental characteristics, irrespective of whether it travels on tracks, wheels, or other means.

(2) The following requirements apply to equipment identified in paragraph (b)(1) of this section:

(i) Sections 1926.1400 through 1926.1414; §§ 1926.1417 through 1926.1425; § 1926.1426(d), §§ 1926.1427 through 1926.1434; § 1926.1437, § 1926.1439, and § 1926.1441.

(ii) The following portions of § 1910.179:

(A) Paragraphs (b)(5), (6), (7); (e)(1), (3), (5), (6); (f)(1), (4); (g); (h)(1), (3); (k); and (n) of § 1910.179.

(B) The definitions in § 1910.179(a) except for “hoist” and “load.” For those words, the definitions in § 1926.1401 apply.

(C) Section 1910.179(b)(2), but only where the equipment identified in paragraph (b)(1) of this section (§ 1926.1438) was manufactured before September 19, 2001.

(iii) For equipment manufactured on or after September 19, 2001, the following

App. 317

sections of ASME B30.2-2005 (incorporated by reference, see § 1926.6) apply: 2-1.3.1; 2-1.3.2; 2-1.4.1; 2-1.6; 2-1.7.2; 2-1.8.2; 2-1.9.1; 2-1.9.2; 2-1.11; 2-1.12.2; 2-1.13.7; 2-1.14.2; 2-1.14.3; 2-1.14.5; 2-1.15.; 2-2.2.2; 2-3.2.1.1. In addition, 2-3.5 applies, except in 2-3.5.1(b), “29 CFR 1910.147” is substituted for “ANSI Z244.1.”

**§ 1926.1439 Dedicated pile drivers.**

- (a) The provisions of subpart CC apply to dedicated pile drivers, except as specified in this section.
- (b) Section 1926.1416(d)(3) (Anti two-blocking device) does not apply.
- (c) Section 1926.1416(e)(4) (Load weighing and similar devices) applies only to dedicated pile drivers manufactured after [INSERT DATE 1 YEAR AND 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].
- (d) In § 1926.1433, only §§ 1926.1433(d) and (e) apply to dedicated pile drivers.

**§ 1926.1440 Sideboom cranes.**

- (a) The provisions of this standard apply, except § 1926.1402 (Ground conditions), § 1926.1415 (Safety devices), § 1926.1416 (Operational aids), and § 1926.1427 (Operator qualification and certification).

(b) Section 1926.1426 (Free fall and controlled load lowering) applies, except § 1926.1426(a)(2)(i). Sideboom cranes in which the boom is designed to free fall (live boom) are permitted only if manufactured prior to [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(c) Sideboom cranes mounted on wheel or crawler tractors must meet all of the following requirements of ASME B30.14-2004 (incorporated by reference, see § 1926.6):

- (1) Section 14-1.1 (“Load Ratings”).
- (2) Section 14-1.3 (“Side Boom Tractor Travel”).
- (3) Section 14-1.5 (“Ropes and Reeving Accessories”).
- (4) Section 14-1.7.1 (“Booms”).
- (5) Section 14-1.7.2 (“General Requirements – Exhaust Gases”).
- (6) Section 14-1.7.3 (“General Requirements – Stabilizers (Wheel-Type Side Boom Tractors)”).
- (7) Section 14-1.7.4 (“General Requirements – Welded Construction”).
- (8) 14-1.7.6 (“General Requirements – Clutch and Brake Protection”).

(9) Section 14-2.2.2 (“Testing – Rated Load Test”), except that it applies only to equipment that has been altered or modified.

(10) In section 14-3.1.2 (“Operator Qualifications”), paragraph (a), except the phrase “When required by law.”

(11) In section 14-3.1.3 (“Operating Practices”), paragraphs (e), (f)(1) – (f)(4), (f)(6), (f)(7), (h), and (i).

(12) In section 14-3.2.3 (“Moving the Load”), paragraphs (j), (l), and (m).

**§ 1926.1441 Equipment with a rated hoisting/lifting capacity of 2,000 pounds or less.**

The following paragraphs of this section specify requirements for employers using equipment with a maximum rated hoisting/lifting capacity of 2,000 pounds or less.

(a) The employer using this equipment must comply with the following provisions of this subpart: § 1926.1400 (Scope); § 1926.1401 (Definitions); § 1926.1402 (Ground conditions); § 1926.1403 (Assembly/disassembly—selection of manufacturer or employer procedures); § 1926.1406 (Assembly/disassembly—employer procedures); §§ 1926.1407 through 1926.1411 (Power line safety); § 1926.1412(c) (*Post-assembly*); §§ 1926.1413 through 1926.1414 (Wire rope); § 1926.1418 (Authority to stop operation); §§ 1926.1419 through 1926.1422 (Signals); § 1926.1423 (Fall protection); § 1926.1425 (Keeping

clear of the load) (except for § 1926.1425(c)(3) (qualified rigger)); § 1926.1426 (Free fall and controlled load lowering); § 1926.1432 (Multiple crane/derrick lifts—supplemental requirements); § 1926.1434 (Equipment modifications); § 1926.1435 (Tower cranes); § 1926.1436 (Derricks); § 1926.1437 (Floating cranes/derricks and land cranes/derricks on barges); § 1926.1438 (Overhead & gantry cranes).

(b) Assembly/disassembly.

(1) In addition to compliance with §§ 1926.1403 (Assembly/disassembly—selection of manufacturer or employer procedures) and 1926.1406 (Assembly/disassembly—employer procedures), the employer must also comply with § 1926.1441(b)(2)-(3).

(2) Components and configuration. The employer must ensure that:

(i) The selection of components, and the configuration of the equipment, that affect the capacity or safe operation of the equipment complies with either the:

(A) Manufacturer instructions, recommendations, limitations, and specifications. When these documents and information are unavailable, a registered professional engineer familiar with the type of equipment involved must approve, in writing, the selection and configuration of components; or



App. 321

(B) Approved modifications that meet the requirements of § 1926.1434 (Equipment modifications).

(ii) Post-assembly inspection. Upon completion of assembly, the equipment is inspected to ensure that it is in compliance with paragraph (b)(2)(i) of this section (see § 1926.1412(c) for post-assembly inspection requirements).

(3) Manufacturer prohibitions. The employer must comply with applicable manufacturer prohibitions.

(c) Operation – procedures.

(1) The employer must comply with all manufacturer procedures applicable to the operational functions of the equipment, including its use with attachments.

(2) Unavailable operation procedures. The employer must:

(i) When the manufacturer's procedures are unavailable, develop, and ensure compliance with, all procedures necessary for the safe operation of the equipment and attachments.

(ii) Ensure that procedures for the operational controls are developed by a qualified person.

(iii) Ensure that procedures related to the capacity of the equipment are developed and signed by a registered professional engineer familiar with the equipment.

(3) Accessibility. The employer must ensure that:

(i) The load chart is available to the operator at the control station;

(ii) Procedures applicable to the operation of the equipment, recommended operating speeds, special hazard warnings, instructions, and operator's manual are readily available for use by the operator.

(iii) When rated capacities are available at the control station only in electronic form and a failure occurs that makes the rated capacities inaccessible, the operator immediately ceases operations or follows safe shut-down procedures until the rated capacities (in electronic or other form) are available.

(d) Safety devices and operational aids.

(1) The employer must ensure that safety devices and operational aids that are part of the original equipment are maintained in accordance with manufacturer procedures.

(2) Anti two-blocking. The employer must ensure that equipment covered by this section manufactured more than one year after [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] have either an anti two-block device that meets the requirements of § 1926.1416(d)(3), or is designed so that, in the event of a two-block situation, no damage or load failure will occur (for example, by using a power unit that stalls in response to a two-block situation).

(e) Operator qualifications. The employer must train each operator, prior to operating the equipment, on the safe operation of the type of equipment the operator will be using.

(f) Signal person qualifications. The employer must train each signal person in the proper use of signals applicable to the use of the equipment.

(g) [Reserved.]

(h) Inspections. The employer must ensure that equipment is inspected in accordance with manufacturer procedures.

(i) [Reserved.]

(j) Hoisting personnel. The employer must ensure that equipment covered by this section is not used to hoist personnel.

(k) Design. The employer must ensure that the equipment is designed by a qualified engineer.

§ **1926.1442 Severability.**

(a) Should a court of competent jurisdiction hold any provision(s) of subpart CC to be invalid, such action shall not affect any other provision of the subpart.

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**APPENDIX E**

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**29 U.S.C. § 667**

(a) Assertion of State standards in absence of applicable Federal standards

Nothing in this chapter shall prevent any State agency or court from asserting jurisdiction under State law over any occupational safety or health issue with respect to which no standard is in effect under section 655 of this title.

(b) Submission of State plan for development and enforcement of State standards to preempt applicable Federal standards

Any State which, at any time, desires to assume responsibility for development and enforcement therein of occupational safety and health standards relating to any occupational safety or health issue with respect to which a Federal standard has been promulgated under section 655 of this title shall submit a State plan for the development of such standards and their enforcement.

(c) Conditions for approval of plan

The Secretary shall approve the plan submitted by a State under subsection (b) of this section, or any modification thereof, if such plan in his judgment--

(1) designates a State agency or agencies as the agency or agencies responsible for administering the plan throughout the State,

(2) provides for the development and enforcement of safety and health standards relating to one or more safety or health issues, which standards (and the enforcement of which standards) are or will be at least as effective in providing safe and healthful employment and places of employment as the standards promulgated under section 655 of this title which relate to the same issues, and which standards, when applicable to products which are distributed or used in interstate commerce, are required by compelling local conditions and do not unduly burden interstate commerce,

(3) provides for a right of entry and inspection of all workplaces subject to this chapter which is at least as effective as that provided in section 657 of this title, and includes a prohibition on advance notice of inspections,

(4) contains satisfactory assurances that such agency or agencies have or will have the legal authority and qualified personnel necessary for the enforcement of such standards,

(5) gives satisfactory assurances that such State will devote adequate funds to the administration and enforcement of such standards,

(6) contains satisfactory assurances that such State will, to the extent permitted by its law, establish and maintain an effective and

comprehensive occupational safety and health program applicable to all employees of public agencies of the State and its political subdivisions, which program is as effective as the standards contained in an approved plan,

(7) requires employers in the State to make reports to the Secretary in the same manner and to the same extent as if the plan were not in effect, and

(8) provides that the State agency will make such reports to the Secretary in such form and containing such information, as the Secretary shall from time to time require.

(d) Rejection of plan; notice and opportunity for hearing

If the Secretary rejects a plan submitted under subsection (b) of this section, he shall afford the State submitting the plan due notice and opportunity for a hearing before so doing.

(e) Discretion of Secretary to exercise authority over comparable standards subsequent to approval of State plan; duration; retention of jurisdiction by Secretary upon determination of enforcement of plan by State

After the Secretary approves a State plan submitted under subsection (b) of this section, he may, but shall not be required to, exercise his authority under sections 657, 658, 659, 662, and 666 of this title with respect to comparable standards promulgated under section 655 of this title, for the period specified in the next sentence. The Secretary may exercise the authority referred to above until he determines, on the basis of

actual operations under the State plan, that the criteria set forth in subsection (c) of this section are being applied, but he shall not make such determination for at least three years after the plan's approval under subsection (c) of this section. Upon making the determination referred to in the preceding sentence, the provisions of sections 654(a)(2), 657 (except for the purpose of carrying out subsection (f) of this section), 658, 659, 662, and 666 of this title, and standards promulgated under section 655 of this title, shall not apply with respect to any occupational safety or health issues covered under the plan, but the Secretary may retain jurisdiction under the above provisions in any proceeding commenced under section 658 or 659 of this title before the date of determination.

(f) Continuing evaluation by Secretary of State enforcement of approved plan; withdrawal of approval of plan by Secretary; grounds; procedure; conditions for retention of jurisdiction by State

The Secretary shall, on the basis of reports submitted by the State agency and his own inspections make a continuing evaluation of the manner in which each State having a plan approved under this section is carrying out such plan. Whenever the Secretary finds, after affording due notice and opportunity for a hearing, that in the administration of the State plan there is a failure to comply substantially with any provision of the State plan (or any assurance contained therein), he shall notify the State agency of his withdrawal of approval of such plan and upon receipt of such notice such plan shall cease to be in effect, but the State may retain jurisdiction in any case commenced before the withdrawal of the plan in order



to enforce standards under the plan whenever the issues involved do not relate to the reasons for the withdrawal of the plan.

(g) Judicial review of Secretary's withdrawal of approval or rejection of plan; jurisdiction; venue; procedure; appropriate relief; finality of judgment

The State may obtain a review of a decision of the Secretary withdrawing approval of or rejecting its plan by the United States court of appeals for the circuit in which the State is located by filing in such court within thirty days following receipt of notice of such decision a petition to modify or set aside in whole or in part the action of the Secretary. A copy of such petition shall forthwith be served upon the Secretary, and thereupon the Secretary shall certify and file in the court the record upon which the decision complained of was issued as provided in section 2112 of Title 28. Unless the court finds that the Secretary's decision in rejecting a proposed State plan or withdrawing his approval of such a plan is not supported by substantial evidence the court shall affirm the Secretary's decision. The judgment of the court shall be subject to review by the Supreme Court of the United States upon certiorari or certification as provided in section 1254 of Title 28.

(h) Temporary enforcement of State standards

The Secretary may enter into an agreement with a State under which the State will be permitted to continue to enforce one or more occupational health and safety standards in effect in such State until final action is taken by the Secretary with respect to a plan submitted by a State under subsection (b) of this

App. 330

section, or two years from December 29, 1970,  
whichever is earlier.

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**APPENDIX F**

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**New York City Administrative Code  
Title 28. New York City Construction Codes  
Chapter 7. The New York City Building Code  
Article 701 Enactment and Update of the New  
York City Building Code  
Chapter 33. Safeguards During Construction or  
Demolition  
Section BC 3316 Hoisting Equipment**

**3316.1. Scope.**

Hoisting equipment shall meet and be used in accordance with the requirements of this section. Material hoists and bucket hoists shall also meet the requirements of Section 3317, personnel hoists shall also meet the requirements of Section 3318, and cranes and derricks shall also meet the requirements of Section 3319.

**3316.2. Requirements.**

Hoisting equipment, its supports and runback structures shall be installed, operated, and maintained to eliminate hazard to the public or to property. It shall be unlawful to operate any such equipment that is not provided with a positive means for preventing the unauthorized operation of such machine. The means whereby such machines may be made inoperative shall be accepted by the department.

## App. 332

### 3316.3. Notification of hoisting accidents.

The owner or person directly in charge of any hoisting equipment shall immediately notify the commissioner following any accident involving hoisting equipment. Following an incident, no person shall permit either of the following, without the permission of the commissioner:

1. Use of such hoisting equipment; or
2. Removal of the hoisting equipment or any part thereof from the area of the job site.

### 3316.4. Permit.

Permits for hoisting equipment shall comply with the requirements of Sections 3316.4.1 through 3316.4.5.

#### 3316.4.1. Acceptance of equipment.

Hoists and all pre-manufactured runback structures shall be approved for use by the commissioner or other agency acceptable to the commissioner

Exception: Cranes and derricks shall meet the requirements of Section 3319.3.

#### 3316.4.2. Posting of permits.

Permits, or duplicates of the permits, shall be posted in a conspicuous location in the car or on the equipment.

## App. 333

### 3316.4.3. Construction documents.

Copies of the written permit application and approved construction documents shall be kept at the site and made available to the commissioner upon request.

### 3316.4.4. Permit signage.

Following the receipt of a permit to install a hoist, the permit holder shall post a sign that meets the requirements of Section 3301.9.6. Such sign shall be clearly visible from the street.

### 3316.4.5. Other temporary signage.

Other than as specified in Section 3301.10, there shall be no information, pictorial representation, or any business or advertising messages posted on the hoisting equipment or runback structure.

### 3316.5. Design, construction and inspection.

Hoisting equipment, its supports and runback structures shall be designed, constructed and inspected in accordance with rules promulgated by the commissioner.

### 3316.6. Rope inspection and replacement.

All ropes used in hoisting equipment shall meet the inspection and replacement requirements specified in rules promulgated by the commissioner.

## App. 334

### 3316.7. Operation.

Only operators designated by the person causing such hoisting equipment to be used shall operate such hoisting machinery. Operators and signalmen/signalwomen shall be qualified for the operation they perform. The operator shall be responsible for making the machine inoperative before he or she leaves the machine.

#### 3316.7.1. Use.

Hoisting equipment, its supports and runback structures shall be operated in compliance with the manufacturing specifications, the requirements of this code, and rules promulgated by the commissioner. If there is a discrepancy, the stricter requirement shall be met.

#### 3316.7.2. Use during installation, jumping, dismantling, or alteration.

Personnel and building materials connected with or related to the building project shall not be moved by the hoist while it is being installed, jumped, dismantled or altered.

### 3316.8. Maintenance.

Hoisting equipment, its supports and runback structures shall be maintained in compliance with the manufacturing specifications and rules promulgated by the commissioner. If there is a discrepancy, the stricter requirement shall be met.

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**APPENDIX G**

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**New York City Administrative Code  
Title 28. New York City Construction Codes  
Chapter 7. The New York City Building Code  
Article 701 Enactment and Update of the New  
York City Building Code  
Chapter 33. Safeguards During Construction or  
Demolition  
Section BC 3319 CRANES AND DERRICKS**

**3319.1. Scope.**

The construction, installation, inspection, maintenance and use of cranes and derricks shall be in conformance with the requirements of this section, Section 3316, and with rules promulgated by the commissioner.

**3319.3. Requirements.**

No owner or other person shall authorize or permit the operation of any crane or derrick without a certificate of approval, a certificate of operation and a certificate of on-site inspection.

**Exceptions:**

1. The requirements of this section shall not apply to excavating or earth-moving equipment, except cranes used with clamshells.

App. 336

2. The requirements of this section shall not apply to cranes or derricks performing an emergency use pursuant to the lawful order of the head of any department.

3. The requirements of this section shall not apply to mobile cranes, including jibs and any other extensions to the boom not exceeding 50 feet (15 240 mm) in length and with a manufacturer's rated capacity of 3 tons (2722 kg) or less.

4. The requirements of this section shall not apply to mobile cranes, including jibs and any other extensions, exceeding 50 feet (15 240 mm) but not exceeding 135 feet (41 148 mm) in length, and with a manufacturer's rated capacity of 3 tons (2722 kg) or less, except that a certificate of operation, as provided for in Section 3319.5, shall be required. The requirement for a certificate of operation shall not apply to such a crane used exclusively as a man basket. The commissioner may, by rule, exempt other mobile cranes of limited size from any or all requirements of this section.

5. The requirements of this section shall not apply to hoisting machines permanently mounted on the bed of material delivery trucks that are used exclusively for loading and unloading such trucks, provided that the length of boom does not exceed the length of the truck bed by more than 5 feet (1524 mm) and that any material transported thereon shall not be raised more than 2 feet (610 mm) in the unloading process. Operators of such equipment shall be exempt from licensing requirements described in Chapter 4 of Title 28 of the Administrative Code.



6. The requirements of this section shall not apply to cranes or derricks used in industrial or commercial plants or yards not used for the construction of the facility. Floating cranes, floating derricks, and cranes and derricks used on floating equipment shall also be exempt from the requirements of this section. Operators of such equipment shall be exempt from the licensing requirements described in Chapter 4 of Title 28 of the Administrative Code.

7. The requirements of this section shall not apply to augurs, churn-drills and other drilling equipment not used for hoisting any objects. Operators of such equipment shall be exempt from the licensing requirements described in Chapter 4 of Title 28 of the Administrative Code.

8. The requirements of this section shall not apply to derricks having a maximum rated capacity not exceeding 1 ton (907 kg).

9. The requirements of this section shall not apply to mechanic's truck with a hoisting device when used in activities related to the maintenance and repair of construction-related equipment.

10. The requirements of this section shall not apply to articulating boom cranes that do not have an integral hoisting mechanism, and that are used exclusively for loading and unloading of trucks or trailers, provided that the length of boom does not exceed 135 feet (41 148 mm) and that any material transported thereon shall not be raised more than 100 feet (30 480 mm) in the unloading process. Operators of such equipment

## App. 338

shall be exempt from licensing requirements described in Chapter 4 of Title 28 of the Administrative Code.

### 3319.4. Certificate of approval.

Certificates of approval shall comply with the following:

1. The manufacturer, owner, or designated representative of a crane or derrick for which a certificate of approval is sought shall file an application for such certificate of approval and provide such information as set forth in rules promulgated by the commissioner.
2. Upon the department's approval of the application described in item 1 above, the department shall issue a certificate of approval for the equipment and an approval of the submitted load rating chart.
3. A new certificate of approval shall be required when a crane or derrick is modified or altered to increase the boom length, jibs or any extensions to the boom beyond the maximum approval length or when the load ratings are increased.

### 3319.5. Certificate of operation.

Certificates of operation shall comply with the following:

1. The commissioner shall issue the initial certificate of operations for the crane or derrick with certificate of approval upon satisfactory inspection and test indicating that such crane or derrick is in a safe

App. 339

operating condition. The initial certificate of operation shall expire one year from the date of issuance.

2. The owner of a crane or derrick covered by the certificate of operation shall renew the certificate of operation each year.

3. If the owner of the covered crane or derrick applies for renewal of a certificate of operation within not more than 60 nor less than 30 days prior to the date of its expiration, such owner may continue to use the covered crane or derrick until the department grants or denies a new certificate;

4. When a crane or derrick configuration is changed to increase the boom length, jibs or any extensions to the boom beyond the maximum approval length or when the load ratings are increased, a new certificate of operation shall be required. In such a case, the crane or derrick may not be operated until the new certificate of operation is obtained.

5. An application for a new certificate of operation shall be submitted when attachments that affect the stability or structure of the crane or derrick are added. Calculations and load rating charts as required by rules promulgated by the commissioner shall be submitted with the renewal request.

3319.6. Certificate of on-site inspection.

Certificates of on-site inspection shall comply with the following:

App. 340

1. The equipment user, or his or her designated representative, shall obtain a certificate of on site inspection for the use of any crane or derrick used for construction or demolition purposes at each job site. Such application for the certificate of on-site inspection shall include information set forth in rules promulgated by the commissioner.
2. Upon approval of the application, a copy of such approval shall be given to the applicant. It shall be unlawful to operate the equipment that is the subject of the approval until it has been inspected and found to be satisfactory by the department as set forth in rules promulgated by the commissioner. Upon inspection and a finding of satisfactory compliance, the approval shall be deemed a certificate of on-site inspection, which shall expire one year from the date of issuance. A certificate of on-site inspection may be renewed in accordance with rules promulgated by the commissioner;
3. The certificate of on-site inspection is y valid only if the conditions and statements contained in the approved application are complied with and the crane or derrick is operated in conformance with the provisions of this section and the rules applicable thereto.
4. A certificate of on-site inspection is not required for cranes or derricks performing work exempted from such requirement by rules promulgated by the commissioner.

## App. 341

### 3319.7. Temporary certificates.

The commissioner may issue temporary certificates of approval, operation and on-site inspection for any crane or derrick during the pendency of an application for certificates of approval and operation upon inspection and upon such analysis and testing as the commissioner may deem necessary. The commissioner may revoke such temporary certificates if the application is denied.

### 3319.8. Special provisions for tower and climber cranes.

Tower and climber cranes shall comply with the following requirements:

#### 3319.8.1. Plan for the erection, jumping, climbing, and dismantling of tower or climber cranes.

An erection, jumping, climbing and dismantling plan for tower or climber cranes, other than truck and crawler mounted tower cranes, shall be submitted to the department by a licensed engineer. The plan must be prepared by a licensed engineer in conjunction with a licensed rigger and must be in compliance with the manufacturer's recommendation for erection, jumping, climbing, or dismantling of the specific crane where such manufacturer's recommendations exist. The plan must be filed with the certificate of on-site inspection application as required by section 3319.3. No erection, jumping, climbing, or dismantling of a tower or climber crane shall take place without the prior issuance of a certificate of on-site inspection by the cranes and derricks unit. The plan shall include the following:

App. 342

1. Identification of the equipment proposed to be used; including all machines proposed to be used in the erection or dismantling;
2. A detailed identification of the assemblies and components required for the erection and dismantling of the equipment;
3. Location of the equipment, sidewalk sheds (or Department of Transportation street closing permits, if applicable), surrounding buildings, protection for their roofs and the pick-up points, loads, and radius of swing of all loads. In addition, the safe load from the approved load radius chart shall be submitted for lift radius;
4. A weight list of all assemblies and components proposed to be lifted. Components are to be clearly marked with their weight painted on the assembly or stamped on metal tags attached to the assembly. The manufacturer of the climber or tower crane shall certify the weight of assemblies and components. Alternately, in lieu of painted weight markings or metal tags, or when the manufacturer's certification is not available, the licensed engineer applicant shall certify an erection, jumping, climbing or dismantling weight list indicating how such weights were determined;
5. The center of gravity of all asymmetrical components shall be located and shown;
6. A sequence of operation detailing the erection, jumping, climbing, and dismantling, along with the rigging materials to be used in such operations;

App. 343

7. The certification of the calibration as required in item 6 of section 3319.8.8;

8. Cranes or derricks located either within the lot line or on the street and used to erect, jump, climb, or dismantle a tower or climber crane shall be indicated;

9. The names and contact information of the licensed master, climber or tower crane rigger, rigger foreman, and the crane safety coordinator or designee, along with the name and contact information of the company performing the erection, dismantling, climbing and/or jumping work.

3319.8.2. Safety coordination meeting.

The general contractor must hold a safety coordination meeting prior to the initial erection, as well as the dismantling or initial jump down, of a climber or tower crane. No work related to the erection, climbing, jumping or dismantling of the tower or climber crane may be performed without the safety coordination meeting having taken place. The following parties must be present at the safety coordination meeting:

1. General contractor or designee;
2. Professional engineer of record for the crane or designee;
3. Licensed master, tower or climber crane rigger and rigger foreman;
4. Crane safety coordinator;

App. 344

5. Site safety manager or coordinator, if required for the job by Chapter 33 of the code;
6. Licensed crane operator and oiler; and
7. Any other parties the department deems necessary.

3319.8.3. Pre-jump safety meeting.

The general contractor must coordinate a pre-jump safety meeting no more than 24 hours prior to each instance of a tower or climber crane jump or climb. No work related to the jumping or climbing of the tower or climber crane may be performed without the pre-jump safety meeting having taken place. The following parties must be present at the pre-jump safety meeting:

1. General contractor or designee;
2. Licensed master, tower or climber crane rigger and rigger foreman;
3. Crane safety coordinator;
4. Site safety manager or coordinator, if required for the job by Chapter 33 of the building code;
5. Licensed crane operator and oiler;
6. "Jumping" crew and back-up personnel;
7. Flagman/woman where required;



App. 345

8. Signalman/woman and communications personnel;  
and

9. Any other parties the department deems necessary.

3319.8.4.1. Meeting notifications.

The general contractor must notify the department at least 48 hours in advance of any safety coordination meeting or pre-jump safety meeting. No work related to the erecting, jumping, climbing, or dismantling of the tower or climber crane is to be performed without prior notice of the meeting having been given to the department.

3319.8.4.2. Time schedule.

A time schedule including date and time of day that the erection, jumping, climbing, or dismantling is proposed to take place shall be provided as soon as it is known by the general contractor.

3319.8.5. Safety coordination and pre-jump safety meeting topics.

The following topics are to be covered during safety coordination and pre-jump safety meetings:

1. Scope of work;
2. Roles and responsibilities;
3. Rigging to be used and the specific sequence of operations;

App. 346

4. Inspection of all rigging equipment, materials, and tools prior to work;
5. Review of all equipment, including but not limited to, collars, ties, and bolts;
6. Permit validity;
7. Qualifications and training of personnel;
8. Relevant weather warnings;
9. Compliance with the manufacturer's manual; and
10. Softening mechanisms, if using nylon slings.

3319.8.6. Meeting log.

The general contractor, or his or her designee, and/or the company erecting, jumping, climbing, or dismantling the tower or climber crane shall keep a log on site and available to the department at all times that shall include:

1. the dates and times of all safety coordination meetings and pre-jump safety meetings held;
2. the names, titles, and company affiliations of all those present at the meetings;
3. a summary of what was discussed during each meeting, including specific tasks and the name of the person to whom they were assigned;
4. a list of the decisions made at the meeting; and

App. 347

5. certification of worker training pursuant to Section 3319.10.

3319.8.7. Inspection and certification by the engineer of record.

Prior to jumping or climbing a tower or climber crane, the engineer of record for the crane must provide the department with a certified, signed, and sealed report stating that:

1. he or she (or his or her designee) has inspected the crane installation prior to the pre-jump safety meeting, and providing the date of inspection;
2. he or she has found no hazardous conditions during the crane inspection or any other condition within his or her purview that adversely affects the safety of erection, dismantling, climbing, or jumping operations;
3. the crane is installed according to the plans approved by the department as well as in accordance with the manufacturer's specifications to the extent applicable; and
4. the appropriate technical testing records for the crane, including torque, plumb, and magnetic particle or other appropriate reports comply with safety requirements and with the manufacturer's specifications.

3319.8.8. Erection, jumping, climbing, and dismantling operations.

App. 348

The erection, jumping, climbing, and dismantling operations for tower and climber cranes shall be subject to the following requirements:

1. The licensed master, tower or climber crane rigger, the rigger foreman, and the crane safety coordinator or designee, shall be present at the job site during erection, jumping, climbing, and dismantling of the tower or climber crane;
2. Cranes or derricks located either within the lot line or on the street, and used to erect, jump, climb, or dismantle tower or climber cranes, shall be subject to certificate of on-site inspection requirements;
3. A load radius chart approved by department shall be posted in the cabin of the crane;
4. The approved erection, jumping, climbing, or dismantling procedure and sequence, with weights of assemblies and components clearly marked, shall be given by the crane safety coordinator to the licensed operator of the crane or derrick and to the rigger prior to commencement of the work;
5. No tower or climber crane shall be placed, erected or disassembled in any roadway, sidewalk, or street unless a permit is first obtained from the New York City Department of Transportation;
6. All accepted or approved installed safety devices on a crane involved in the erection, jumping, climbing, or dismantling procedure shall have been calibrated within the time period provided by department rules or manufacturer's specifications; and

App. 349

7. The safety devices of the tower or climber crane shall be inspected by the licensed crane operator as part of the inspection procedure.

3319.9. Slings.

Slings shall be used in accordance with the following requirements and any rules promulgated by the commissioner.

3319.9.1. Use of nylon slings in conjunction with climber or tower crane erection, jumping, climbing, and dismantling.

Nylon slings shall only be used in conjunction with climber or tower crane erection, jumping, climbing, and dismantling if the manufacturer's manual specifically states or recommends the use of nylon slings. Nylon slings shall not be used unless softening mechanisms have been applied to all sharp edges.

3319.9.2. Discarded rope.

Discarded rope shall not be used for slings.

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**APPENDIX H**

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**RS 19-2 Power Operated Cranes and Derricks**

**RS 19-2 POWER OPERATED CRANES AND DERRICKS**

**1.0 Scope.**-This standard applies to the construction, installation, inspection, maintenance and use of power operated cranes and derricks used for hoisting and/or rigging purposes; or used for the construction, alteration, demolition, excavation and maintenance purposes, including highways or sewers; or used for the installation of piles; or used for the hoisting or lowering of any article on the outside of any building or structure.

**1.1 Exemptions.**-Exempt from the requirements of this reference standard are the following:

**1.1.1** Cranes or derricks used in industrial or commercial plants or yards and floating cranes, floating derricks and cranes and derricks used on floating equipment. Also augers, churn-drills and other drilling equipment. Operators of such equipment shall be exempt from any licensing requirements.

**1.1.2** Operators of cranes described in section C26-1909.4(a)(3) and (4) of the administrative code shall be exempt from any licensing requirements where the cranes are used in connection with the installation or

maintenance of street lighting or public utility overhead power distribution systems.

1.1.3 Derricks having a maximum rated capacity not exceeding one ton.

## **2.0 Definitions.-**

**2.1 ACCESSORY.**-A secondary part of assembly of parts which contributes to the overall function and usefulness of a machine.

**2.2 APPOINTED.**-Assigned specific responsibilities by the employer or by the employers representative.

**2.3 ANGLE INDICATOR** (boom).-An accessory which measures the angle of the boom to the horizontal.

**2.4 AUXILIARY HOIST.**-(See Whipline).

**2.5 AXIS OF ROTATION.**-The vertical axis around which the crane superstructure rotates.

**2.6 AXLE.**-The shaft or spindle with which or about which a wheel rotates. On truck and wheel mounted cranes it refers to an automotive type of axle assembly including housing, gearing, differential, bearings and mounting appurtenances.

**2.7 AXLE** (bogie).-Two or more automotive type axles mounted in tandem in a frame so as to divide the load between the axles and permit vertical oscillation of the wheels.

**2.8 BASE** (mounting). The base or carrier on which the rotating superstructure is mounted such as a truck, crawler or platform.

**2.9 BOOM.** A timber or metal section or strut. The heel (lower end) is affixed to a base, carriage or support, and the upper end supports a cable and sheaves where the load is lifted by means of wire rope and hook.

**2.10 BOOM ANGLE.** The angle between the longitudinal centerline of the boom and the horizontal. The boom longitudinal centerline is a straight line between the boom foot pin (heel pin) centerline, and boom point sheave pin centerline.

**2.11 BOOM HARNESS.** The block and sheave arrangement on the boom point to which the topping lift cable is reeved for lowering and raising the boom.

**2.12 BOOM HOIST.** A hoist drum and rope reeving system used to raise and lower the boom.

**2.13 BOOM POINT.** The outward end of the top section of the boom.

**2.14 BOOM STOP.** A device used to limit the angle of the boom at the highest position.

**2.15 BRAKE.** A device used for retarding or stopping motion by friction or power means.

**2.16 CAB.** A housing which covers the rotating superstructure machinery and/or operators station.



**2.16. 1 CABLEWAY.**-A power operated system for moving loads in a generally horizontal direction in which the loads are conveyed on an overhead cable, track or carriage.

**2.16.2 CLIMBER CRANE.**-A crane erected upon and supported by a building or other structure which may be raised or lowered to different floors or levels of the building or structure.

**2.17 CLUTCH.**-A friction, electromagnetic, hydraulic, pneumatic or positive mechanical device for engagement of power.

**2.18 COUNTERWEIGHT.**-Weight used to supplement the weight of the machine in providing stability for lifting working loads.

**2.19 CRANE.**-A power operated machine for lifting or lowering a load and moving it horizontally which utilizes wire rope and in which the hoisting mechanism is an integral part of the machine.

**2.20 CRAWLER CRANE.**-A crane consisting of a rotating superstructure with power plant, operating machinery and boom, mounted on a base, equipped with crawler treads for travel.

**2.21 DERRICK.**-An apparatus consisting of a mast or equivalent members held at the top by guys or braces, with or without a boom, for use with a hoisting mechanism and operating rope, for lifting or lowering a load and moving it horizontally.

**2.21.1 A-FRAME DERRICK.**-A derrick in which the boom is hinged from a cross member between the bottom ends of two upright members spread apart at the lower ends and joined at the top; the boom point secured to this junction of the side members, and the side members are braced or guyed from the junction point.

**2.21.2 BASKET DERRICK.**-A derrick without a boom, similar to a gin pole with its base supported by ropes attached to corner posts or other parts of the structure. The base is at a lower elevation than its supports. The location of the base of a basket derrick can be changed by varying the length of the rope supports. The top of the pole is secured with multiple reeved guys to position the top of the pole to the desired location by varying the length of the upper guy lines. The load is raised and lowered by ropes through a sheave or block secured to the top of the pole.

**2.21.3 BREAST DERRICK.**-A derrick without a boom. The mast consists of two side members spread farther apart at the base than at the top and tied together at top and bottom by rigid members. The mast is prevented from tipping forward by guys connected to its top. The load is raised and lowered by ropes through a sheave or block secured to the top crosspiece.

**2.21.4 CHICAGO BOOM DERRICK.**-A boom which is attached to a structure, an outside upright member of the structure serving as the mast, and the boom being stepped in a fixed socket clamped to the upright. The derrick is complete with load, boom and boom point swing line falls.

**2.21.5 GIN POLE 2 DERRICK**-A derrick without a boom. Its guys are so arranged from its top to permit leaning the mast in any direction. The load is raised and lowered by ropes reeved through sheaves or blocks at the top of the mast.

**2.21.6 GUY DERRICK.**-A fixed derrick consisting of a mast capable of being rotated, supported in a vertical position by guys, and a boom whose bottom end is hinged or pivoted to move in a vertical plane with a reeved rope between the head of the mast and the boom point for raising and lowering the boom, and a reeved rope from the boom point for raising and lowering the load.

**2.21.7 SHEARLEG DERRICK**-A derrick without a boom. The mast, wide at the bottom and narrow at the top, is hinged at the bottom and has its top secured by a multiple reeved guy to permit handling loads at various radii by means of load tackle suspended from the mast top.

**2.21.8 STIFFLEG DERRICK**-A derrick similar to a guy derrick except that the mast is supported or held in place by two or more stiff members, called stifflegs, which are capable of resisting either tensile or compressive forces. Sills are generally provided to connect the lower ends of the stifflegs to the foot of the mast.

**2.22 DRUM.**-The cylindrical members around which ropes are wound for raising and lowering the load or boom.

**2.23 DYNAMIC** (loading).-Loads introduced into the machine or its components by forces in motion.

**2.23.1 ENGINEER**.-The word engineer as used in these regulations shall mean a licensed professional engineer except that the certifications for matters relating to crane design may be made by an engineer licensed by any state or foreign jurisdiction or upon proof, to the satisfaction of the commissioner, of his professional competence.

**2.23.2 FOLDING BOOM**.-A boom constructed of hinged sections which is articulated in a folding manner and may be folded for storage or transit.

**2.24 GANTRY**(A-Frame)-A structural frame, extending above the superstructure of a mobile crane, to which the boom supports ropes are reeved.

**2.25 GUDGEON PIN**.-A pin connecting the mast cap to the mast, allowing rotation of the mast.

**2.26 GUY**.-A rope used to steady or secure the mast or other members in the desired position.

**2.26.1. HOISTING MACHINE**-A power operated machine used for lifting or lowering a load, utilizing a drum and wire rope, excluding elevators. This shall include but not be limited to a crane, derrick, and cableway.

**2.26.2 HYDRAULIC BOOM**.-A boom which is operated by means of a hydraulic system.

**2.27 JIB.**-An extension attached to the boom point to provide added boom length for lifting specified loads. This jib may be in line with the boom or offset to various angles.

**2.27.1 LAY.**-That distance measured along a cable in which one strand makes a complete revolution around the cable axis.

**2.28 LOAD (working).**-The external load, in pounds, applied to the crane or derrick, including the weight of auxiliary load attaching equipment such as load blocks, shackles, and slings.

**2.29 LOAD BLOCK (upper).**-The assembly of hook or shackle, swivel, sheaves, pins, and frame suspended from the boom point.

**2.30 LOAD BLOCK (lower).**-The assembly of hook or shackle, swivel, sheaves, pins and frame suspended by the hoisting ropes.

**2.31 LOAD HOIST.**-A hoist drum and rope reeving system used for hoisting and lowering loads.

**2.31.1 LOAD INDICATOR.** - A device that measures the weight of the load.

**2.32 LOAD RATINGS.**-Maximum loads that may be lifted by a crane or derrick at various angles and positions as approved by the department.

**2.33 MAST.**-The upright member of a derrick.

**2.33.1 MOBILE CRANE.**-A crawler crane; a truck crane; or a wheel mounted crane.

**2.34 OUTRIGGERS.**-Extendable or fixed metal arms, attached to the mounting base, which rests on supports at the outer ends.

**2.34.1 QUALIFIED PERSON.** - A person who by possession of a recognized degree, certificate or professional standing or who by knowledge, training and experience has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

**2.34.2 RATED CAPACITY INDICATOR.** - A device that automatically monitors radius, load weight, and load rating and warns the crane operator of an overload condition.

**2.34.3 RATED CAPACITY (LOAD) LIMITER.** - A device that automatically monitors radius, load weight, and load rating and prevents movements of the crane which would result in an overload condition.

**2.35 REEVING.**-A rope system in which the rope travels around drums and sheaves.

**2.36 ROPE.**-Refers to wire rope unless otherwise specified.

**2.37 SIDE LOADING.**-A load applied at an angle to the vertical plane of the boom.

**2.38 SILL.**-A member connecting the foot block and stiffleg or a member connecting the lower ends of a double member mast.

**2.39 STANDING (GUY) ROPE.**-A supporting rope which maintains a constant distance between the points of attachment to the two components connected by the rope.

**2.40 STRUCTURAL COMPETENCE.**-The ability of the machine and its component to withstand the stresses imposed by applied loads.

**2.41 SUPERSTRUCTURE.** The rotating upper frame structure of the machine and the operating machinery mounted thereon.

**2.42 SWING.** Rotation of the superstructure for movement of loads in a horizontal direction about the axis of rotation.

**2.43 SWING MECHANISM.** The machinery involved in providing rotation of the superstructure.

**2.44 TACKLE.** An assembly of ropes and sheaves arranged for hoisting and pulling.

**2.44.1 TELESCOPIC BOOM.**A boom constructed of sections of diminishing cross sections in which the sections fit within each other. The boom may be extended in a manner similar to a telescope.

**2.44.2 TOWER CRANE.**-A crane in which a boom, swinging jib or other structural member is mounted upon a vertical mast or tower.

**2.45 TRANSIT.**-The moving or transporting of a crane from one job site to another.

**2.46 TRAVEL.**-The function of the machine moving from one location to another, on a job site.

**2.47 TRAVEL MECHANISM.**-The machinery involved in providing travel power.

**2.48 TRUCK CRANE.**-A crane consisting of a rotating superstructure with power plant, operating machinery and boom, mounted on an automotive truck equipped with a power plant for travel.

**2.48.1 TRUCK MOUNTED TOWER CRANE.**-A tower crane which is mounted on a truck or similar carrier for travel or transit.

**2.48.2 TWO-BLOCKING.** - A condition in which the lower load block or hook assembly comes into contact with the upper load block or boom point sheave assembly.

**2.49 WHEEL BASE.**-Distance between centers of front and rear axles. For a multiple axle assembly the axle center wheel base measurement is taken as the midpoint of the assembly.

**2.50 WHEEL MOUNTED CRANE** (wagon crane).-A crane consisting of a rotating superstructure with power plant, operating machinery and boom, mounted on a base or platform equipped with axles and rubber tired wheels for travel. The base is usually propelled by the engine in the superstructure, but it may be equipped with a separate engine controlled from the



superstructure. Its function is to hoist and swing loads at various radii.

**2.51 WHIPLINE** (auxiliary hoist).-A separate hoist rope system of lighter load capacity and higher speed than provided by the main hoist.

**2.52 WINCH HEAD**.-A power driven spool for handling of loads by means of friction between fiber or wire rope and spool.

### **3.0 Filing Applications for Approval and Operation of Cranes and Derricks. -**

**3.1 Certificate of approval.** -The application for a certificate of approval required by Subchapter 19, Article 10 of the New York City Building Code shall be filed by an engineer and shall include the following information:

1. Affidavit of compliance from the manufacturer as detailed in section 3.2 below,
2. Operator's manual showing all configurations for which the engineer is seeking approval, general equipment specifications and manufacturer's recommended maintenance procedures,
3. An advertising brochure or drawing showing the general configuration and specifications for which the engineer is seeking approval,
4. Load rating chart with chart number and page numbers for identification,

5. Certification from the engineer that he/she has reviewed the manufacturer's design calculations and testing or has prepared sufficient calculations, as prescribed in section 3.2 below and found that the design of the derrick or crane conforms to the New York City Building Code, and

6. Any supporting data, drawings, or calculations upon request.

**Exception: Third party certification:** In lieu of the engineer's certification of the design calculations, the engineer may submit a third-party certification by a competent individual or organization, other than the manufacturer, acceptable to the commissioner stating that the tests specified in section 4.2 below were monitored and certified.

**3.2 Affidavit of compliance.** - The affidavit of compliance from the manufacturer shall include the following:

1. List of all components; maximum boom length, maximum jib(s) length, maximum length of all other attachments,
2. List of all counterweight combinations,
3. List of standards used in the design of the boom and/or mast,
4. List of standards used in the design of the jib and/or extensions,

App. 363

5. List of standards used in the design of the boom support system,
6. List of standards used in the design of the counterweight support system and attachments,
7. List of standards used in the design of the rope,
8. List of standards used in design of overturning stability,
9. List of standards used in the prototype testing, and
10. List of material(s) and material specifications used in the components listed in Numbered Items 3-7 above.

**Exception to required items:** Numbered items 2, 6, 8, and 9 above are not required for derricks.

**4.0 Design, construction, and testing of mobile cranes. -**

**4.1 Design and construction of mobile cranes.-**

**4.1.1 Design and construction of mobile cranes manufactured and submitted prior to October 1, 2006.** Mobile cranes, and their components, manufactured and submitted prior to October 1, 2006 shall, in their entirety, be designed and constructed in accordance with ANSI B30.5 – 1968.

**4.1.2 Design and construction of mobile cranes manufactured and submitted on or after October 1, 2006.** Mobile cranes, and their components, manufactured and submitted on or after October 1,

2006, shall, in their entirety, be designed and constructed in accordance with one of the following standards:

1. ANSI B30.5 – 2004 Chapter 5-1 except Section 5-1.9.9
2. CEN EN 13000 (2004) except Section 4.2.6

**4.1.3 Design and construction of mobile cranes manufactured prior to October 1, 2006 but submitted after October 1, 2006.** Mobile cranes, and their components, submitted on or after October 1, 2006, but manufactured before October 1, 2006, shall, in their entirety, be designed and constructed in accordance with one of the following standards:

1. ANSI B30.5 – 2004 Chapter 5-1 except Section 5-1.9.9
2. ANSI B30.5 – 2000 Chapter 5-1 except Section 5-1.9.9
3. ANSI B30.5 – 1994 Chapter 5-1 except Section 5-1.9.9
4. ANSI B30.5 – 1989 Chapter 5-1 except Section 5-1.9.9
5. ANSI B30.5 – 1982 Chapter 5-1 except Section 5-1.9.9
6. CEN EN 13000 (2004) except Section 4.2.6
7. Such other standard as the Commissioner deems appropriate.

## **4.2 Prototype testing of mobile cranes. -**

**4.2.1 Prototype testing of mobile cranes submitted prior to October 1, 2006.** A prototype of each mobile crane, and their components, submitted before October 1, 2006 shall be tested for strength and stability in accordance with ANSI B30.5-1968. Lattice boom cranes shall also be tested in accordance with SAE J987 and all mobile cranes with lattice or hydraulic booms shall also be tested in accordance with SAE J765.

**4.2.2 Prototype testing of mobile cranes submitted on or after October 1, 2006.** A prototype of each mobile crane, and their components, submitted on or after October 1, 2006 shall meet the prototype testing requirements in Test Option A or Test Option B as outlined below:

### **1. Test Option A:**

(a) The following applies to equipment with cantilevered booms (such as hydraulic boom cranes): All tests listed in SAE J1063 - 1993, Table 1, shall be performed to load all critical structural elements to their respective limits. All the strength margins listed in SAE J1063 - 1993, Table 2 shall be met.

(b) The following applies to equipment with pendant supported lattice booms: All the tests listed in SAE J987 - 2003, Table 1, shall be performed to load all critical structural elements to their respective limits. All the strength margins listed in SAE J987 - 2003, Table 2 shall be met.

## App. 366

(c) Load rating charts shall be established by tests performed in accordance with SAE J765 - 1990, Crane Load Stability Test.

### 2. Test Option B:

(a) The following applies to equipment with cantilevered booms (such as hydraulic boom cranes): The analysis methodology, such as computer modeling, must demonstrate that all load cases listed in SAE J1063 - 1993 meet the strength margins listed in SAE J1063-1993 Table 2.

(b) The following applies to equipment with pendant supported lattice booms: The analysis methodology, such as computer modeling, must demonstrate that all load cases listed in SAE J987 - 2003 meet the strength margins listed in SAE J987- 2003 Table 2.

(c) The analysis methodology, such as computer modeling, must demonstrate that the load chart ratings meet the requirements of SAE J765 - 1990.

(d) Analysis verification. The physical testing requirements under SAE J1063 - 1993 and SAE J987 - 2003 must be met unless the reliability of the analysis methodology, such as computer modeling, has been demonstrated by a documented history of verification through strain gauge measuring or strain gauge measuring in combination with other physical testing. The physical testing requirements of SAE J765 – 1990 must be met unless the reliability of the analysis methodology, such as computer modeling, has been demonstrated by physical testing.

## **8.0 Certificate of On-Site Inspection.-**

### **8.1 Use of cranes and derricks at job sites. -**

8.1.1 In order to operate a crane or derrick at a job site, a certificate of on-site inspection is required as stipulated in C26-1909.4(d). The owner of the premises, building or structure, or his designated representative, shall file an application in quadruplicate at the department office in the borough where the premises is located. Such application shall be accompanied by plans showing proposed locations of the crane or derrick, pertinent features of the site such as assumed soil bearing values, ground elevations and slopes, vaults or other subsurface structures, supporting platforms or structures, and the swing of the crane or derrick. Also, a document shall be submitted, signed by a licensed engineer or registered architect which shall include the following information where the crane or derrick is to be supported by soil:

- (a) That he has inspected the soil at the proposed location or locations of the crane or derrick;
- (b) His estimate of the soil bearing value;
- (c) That he has explored the existence of any sheeting or retaining walls supporting soil adjoining any excavation which may be affected and certifies as to its adequacy;
- (d) If the crane or derrick is to be on the street, that he has explored the existence of vaults or other subsurface structures which could impair the bearing value of the street or sidewalk;

(e) That the load imposed upon the soil by the crane or derrick including supporting platform, does not exceed such bearing value under any condition of loading.

8.1.2 Where a crane not exceeding 160 feet in height, including jibs and any other extensions to the boom is to be used for a period not exceeding 24 hours, or a crane not exceeding 50 feet in height, including jibs and any other extensions to the boom with a maximum rated capacity of 20 tons, is to be positioned on the roadway or sidewalk, a certificate of on-site inspection shall be required. However, the requirements relating to plans and a document of a licensed professional engineer or registered architect enumerated in 8.1.1 of this reference standard shall not apply nor shall the three regular working day provisions of section C26-1909.4(d) be applicable under the following conditions:

(1) That a prototype approval has been obtained showing the means required to distribute the weight of the crane and the maximum working loads.

(2) A statement from the owner of the structure, building or premises or his authorized agent that he visited the site and that there are no excavations or retaining walls and that no vaults or subsurface construction exists at the site.

8.1.3 A certificate of on-site inspection shall not be required under the following conditions:

8.1.3.1 For a crane not exceeding 160 feet in height including jibs and any other extensions to the boom, which is to be used for a period not exceeding 48 hours and operating entirely within the property lines and in



such locations which are at least a boom length, including jibs and any extensions thereof, distant from all lot lines.

8.1.3.2 For service cranes and clamshells operated entirely within the property lines and within such locations which do not involve the moving of any loads over the roadway or sidewalk. This exemption shall apply only to cranes with a boom length, including jibs and any extension thereof, not exceeding 110 feet.

8.1.3.3 For the use of cranes as provided for in 8.1.3.1 and 8.1.3.2, notice of the operation of the crane at the job site shall be given to the division of cranes and derricks, department of buildings, by telephone and confirmed in writing. It shall be the responsibility of an appointed person to provide firm and uniform footing and, when necessary, provide substantial timbers, cribbing or other structural members sufficient to distribute the load so as not to exceed the safe bearing capacity of the underlying material.

## **8.2 Cranes or Derricks Supported by a Building or Structure.-**

8.2.1 Where the crane or derrick is supported by a building or a structure, the statement by the licensed engineer or registered architect referred to in 8.1.1 shall include the means of supporting and bracing the equipment.

The swing of the crane or derrick shall be shown on the plans to insure clearance during operation. Computations shall be submitted with the application

## App. 370

showing all reactions imposed on the structure by the crane or derrick, including those due to impact and wind. Such computations shall verify that the stability of the building or structure will not be impaired when the crane or derrick is in operation and that no structural members will be overstressed due to forces induced by the crane or derrick.

**8.2.2 Concrete Structures.**-If the structure is a concrete structure, test reports of the compression strength of the concrete shall be submitted to insure that the concrete supports of the crane or derrick have developed sufficient strength to support the crane or derrick before it is installed.

The means for establishing concrete strength before imposing crane or derrick loads upon the structure shall be indicated on the application.

**8.2.3** All anchorages for cranes and derricks shall be approved by an appointed person.

## **8.3 Use of Pile Drivers and Clamshells.-**

**8.3.1** A certificate of on-site inspection shall not be required for pile drivers or clamshells operating entirely within the lot lines under the following conditions:

**8.3.1.1** Where pile driving equipment is designed or supported on a platform so that the soil bearing pressure does not exceed 500 pounds per square foot, a certificate of on-site inspection shall not be required.

## App. 371

8.3.1.2 Where clamshells are operating on construction sites and are at least the depth of excavation height from the edge of the excavation and where the soil bearing pressure does not exceed 500 lbs. per square foot, a certificate of on-site inspection shall not be required.

8.3.1.3 Where the pressure on the soil is in excess of 500 pounds per square foot but does not exceed 2,500 pounds per square foot, a pile driver or clamshell may be operated without a certificate of on-site inspection under the following conditions:

(1) That borings have been filed with the department in the construction application under which the work is being performed, and

(2) An amendment is filed to such application by an engineer or architect certifying that on the basis of the borings, the soil is adequate to support the load to be imposed thereon by the subject equipment.

### **8.4 The Requirements of 8.1.1, 8.2 and Sections C26-1909.4(d) Shall also Apply to Cableways.-**

8.5 Notwithstanding the provisions of 8.0 through 8.4 where a crane is operated on the sidewalk or roadway, a permit from the department of highways shall be obtained and the pressure on such surface shall not exceed 3500 pounds per square foot. The pressure shall be distributed on the roadway by means of timber platforms extending not less than twelve (12) inches beyond the base of the outriggers on all sides and sufficiently thick to uniformly distribute the pressure as required above of all the loads including the weight

of the crane. The timber mats shall have a minimum thickness of two (2) inches. All cranes equipped with steel tracks shall be supported by timber platforms not less than six inches thick and covering the entire base of the crane.

### **9.0 Unsafe Hoisting Machines.-**

9.1 When it is found that equipment is dangerous or unsafe a notice or order to stop work may be issued by the commissioner, or his authorized representative. Such notice or order may be given to the owner or lessee of the equipment involved, or to the agent of any of them, or to the person or persons executing the work or operating the equipment in writing. If the operation of the hoisting machine is not discontinued, the inspector shall report same to his superior and an engineer shall be sent to reinspect. Upon confirmation of the unsafe condition by the engineer, the hoisting machine shall be red tagged. All persons shall be prohibited from using the said equipment until the danger is removed or the unsafe condition is rectified. An unsafe notice shall not be removed from the equipment, except by an authorized inspector or representative of the department of buildings.

### **10.0 Annual Renewal of Certificate of Operation.-**

Application for renewal of a certificate of operation, as stipulated in C26-1909.4 (c), shall be accompanied by inspection and maintenance records in accordance with 15.1 and 18.1. Upon approval of the application, a new certificate of operation shall be issued after a satisfactory inspection by a department inspector.

**13.0 Load Ratings Where Structural Competence Governs Lifting Performance.-**

**13.1** Load ratings for climber, tower cranes and derricks are governed by structural competence. Therefore, the limitation on crane loading must be such that no structural member is overstressed, and load rating charts shall be subject to this limitation.

**13.2 Load Rating Chart.-**

**13.2.1** Tower and climber cranes.- A substantial, durable and clearly legible rating chart shall be provided with each tower and climber crane and securely affixed in the cab. The chart shall include load ratings approved by the department for specific lengths of components, counterweights, swing, and radii.

**15.0 Inspection Required by Owner for Cranes and Derricks.-**

**15.1 Certification and inspections required.-**The owner of a crane or derrick when applying for a certificate of approval in accordance with 3.0 shall certify that all applicable regulations regarding inspection and maintenance will be complied with. All inspections required by the owner shall be performed only by appointed personnel. The inspections shall be performed to provide information requested in a department supplied chart and all deficiencies shall be corrected. No record of information not required by such chart shall be required to be maintained in writing.

**15.2 Inspection classification.**-Inspection procedure for cranes and derricks in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the critical components of the crane or derrick and the degrees of their exposure to wear, deterioration or malfunction. The two general classifications are herein designated as “frequent” and “periodic” with respective intervals between inspections as defined below:

15.2.1 Frequent inspection.-Daily to monthly intervals.

15.2.2 Periodic inspection.-1 to 12 month intervals or as specifically recommended by the manufacturer.

**15.3 Frequent inspection.**-Items such as the following shall be inspected for defects at intervals as defined in 15.2.1 or as specifically indicated, including observation during operation for any defects which might appear between regular inspections. Any defects revealed by inspection shall be corrected. Where such defects constitute a safety hazard, the crane or derrick shall not be operated until such defects are corrected.

15.3.1 All control mechanisms for maladjustment interfering with proper operation.-Daily.

15.3.2 All control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter.

15.3.3 All safety devices for malfunction.

App. 375

15.3.4 Deterioration or leakage in air or hydraulic systems.-Daily

15.3.5 Crane or derrick hooks with deformations or cracks.-Refer to 17.3.3(c).

15.3.6 Rope reeving for non-compliance with crane or derrick manufacturer's recommendations.

15.3.7 Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, moisture accumulation, weatherproofing and grounding.

15.3.8 Tension in derrick guys.-Daily.

15.3.9 Plumb of derrick mast.

15.3.10 Hoist brakes, clutches and operating levers.-Check daily for proper functioning before beginning operations.

**15.4 Periodic inspections of cranes and derricks.-**Complete inspections of the crane or derrick shall be performed at intervals as generally defined in 15.2.2, depending upon its activity, severity of service, and environment, or as required by 15.5.1 or 15.5.2. These inspections shall include the requirements of 15.0, and in addition, items specifically indicated below. Any defects revealed by inspection shall be corrected. Where such defects constitute a safety hazard the crane or derrick shall not be operated until such defects are corrected.

15.4.1 Deformed, cracked or corroded members in the crane or derrick structure and boom.

App. 376

15.4.2 Loose bolts or rivets.

15.4.3 Cracked or worn sheaves and drums.

15.4.4 Worn, cracked or distorted parts such as pins, bearings, shafts, gears, rollers and locking devices.

15.4.5 Excessive wear on brake and clutch system parts, linings, pawls and ratchets.

15.4.6 Load, boom angle and other indicators over their full range, for any significant inaccuracies.

15.4.7 Gasoline, diesel, electric or other power plants for improper performance or non-compliance with safety requirements.

15.4.8 Excessive wear of chain drive sprockets and excessive chain stretch.

15.4.9 Crane or derrick hooks.-Magnetic particle or other suitable crack detecting inspection should be performed at least once each year by an inspection agency retained by the owner and approved by the department. Certified inspection reports are to be made available to the department upon request.

15.4.10 Travel steering, braking and locking devices, for malfunction.

15.4.11 Excessively worn or damaged tires.

15.4.12 Derrick gudgeon pin for cracks, wear and distortion each time the derrick is to be erected.



15.4.13 Foundation or supports shall be inspected for continued ability to sustain the imposed loads.

**15.5 Cranes or derricks not in regular use.-**

15.5.1 A crane or derrick which has been idle for the period of one month or more, but less than six months, shall be given an inspection by the owner conforming with requirements of 15.3 and 18.1.1 before an application for a certificate of on-site inspection in accordance with 27-1057(d) is submitted to the department.

15.5.2 A crane which has been idle for the period of over six months, shall be given a complete inspection by the owner conforming with requirements of 15.3, 15.4 and 18.1.2 before an application for a certificate of on-site inspection in accordance with 27-1057(d) is submitted to the department.

**16.0 Testing Required for Cranes and Derricks, Manufactured After April 1, 1970, by Manufacturer or Owner.-**

**16.1 Operational test.-**

16.1.1 In addition to prototype tests and quality control measures, each new production crane and derrick shall be tested by the manufacturer to the extent necessary to insure compliance with the operational requirements of this section, including functions such as the following:

(a) Load hoisting and lowering mechanisms.

## App. 378

(b) Boom hoisting and lowering mechanisms.

(c) Swinging mechanism.

(d) Traveling mechanism.

(e) Safety devices.

16.1.2 Where the complete production crane or derrick is not supplied by one manufacturer such tests shall be conducted at final assembly.

6.1.3 Operational test and production test results certified by the manufacturer or a licensed professional engineer shall be made available to the department with each application for a certificate of approval for a crane or derrick, in accordance with 3.0.

16.1.4 For all cranes and derricks, where electrically powered, the trip setting of hoist limit switches shall be determined by tests with an empty hook traveling in increasing speeds to the maximum speed. The activating mechanism of the limit switch shall be located so that it will trip the switch under all conditions in sufficient time to prevent contact of the hook or load block with any part of the derrick or crane.

## **17.0 Maintenance of Cranes and Derricks.-**

### **17.1 Preventive maintenance.-**

17.1.1 A preventive maintenance program based on the crane or derrick manufacturer's recommendations shall be established. Dated and detailed records shall be readily available to the department.

17.1.2 It is recommended that replacement parts be obtained from the original equipment manufacturer.

**17.2 Maintenance procedure.-**

17.2.1 Before adjustments and repairs are started on a crane or derrick, the following precautions shall be taken as applicable:

- (a) Crane or derrick placed or arranged where it will cause the least interference with other equipment or operations in the area.
- (b) All controls at the “off” positions.
- (c) Starting means rendered inoperative.
- (d) Warning or “out of order” signs placed on the crane or derrick and hoist.
- (e) Power plant stopped or disconnected at take-off.
- (f) Boom lowered to the ground if possible or otherwise secured against dropping.
- (g) Lower load block lowered to the ground or otherwise secured against dropping.

17.2.2 After adjustment and repairs have been made, the crane or derrick shall not be operated until all guards have been reinstalled, safety devices reactivated and maintenance equipment removed.

### **17.3 Adjustments and Repairs.-**

17.3.1 Any unsafe conditions disclosed by the inspection requirements of 15.0 shall be corrected before operation of the crane or derrick is resumed. Adjustments and repairs shall be done only by competent personnel.

17.3.2 Adjustments shall be maintained to assure correct functioning of components. The following are examples:

- (a) All functional operating mechanisms.
- (b) Safety devices.
- (c) Control systems.
- (d) Power plants.
- (e) Tie downs or anchorages.
- (f) Signal system.
- (g) Guys.

17.3.3 Repairs or replacements shall be provided promptly as needed for safe operation. The following are examples:

- (a) All critical parts of functional operating mechanisms which are cracked, broken, corroded, bent or excessively worn.

(b) All critical parts of the crane or derrick structure which are cracked, bent, broken or excessively corroded.

(c) Crane or derrick hooks showing defects described in 15.3.5 shall be discarded. Repairs by welding or reshaping are not acceptable unless written approval of the department is obtained.

(d) Pitted or burned electrical contacts should be corrected only by replacement and in sets. Controller parts should be lubricated as recommended by the manufacturer.

17.3.4 All replacement parts or repairs shall have at least the original safety factor and be in accordance with the specifications of the manufacturer. Approval of the department shall be required for the replacement or repair of main structural members as enumerated in 1 and 2 of 3.1.1 for which no fee will be required.

#### **17.4 Lubrication of Cranes and Derricks.-**

17.4.1 All moving parts of the crane or derrick and hoist for which lubrication is specified, including rope and chain, shall be regularly lubricated. Lubricating systems shall be checked for proper delivery of lubricant. Particular care should be taken to follow manufacturer's recommendations as to point and frequency of lubrication, maintenance of lubricant levels and types of lubricants to be used. Lubrication shall be performed under the supervision of the crane operator, oiler or maintenance engineer.

17.4.2 Machinery shall be stationary while lubricants are being applied and protection provided as called for in 17.2.1(b) through 17.2.1(e) inclusive, unless such machinery is equipped for automatic lubrication.

## **18.0 Rope Inspection, Replacement and Maintenance by Owner for Cranes and Derricks.-**

### **18.1 Rope Inspection. -**

#### **18.1.1 Frequent Inspection. -**

**18.1.1.1** All ropes in continuous service shall be visually inspected once every working day. A visual inspection shall consist of observation of all rope that can reasonably be expected to be in use during the day's operation. This visual inspection shall be directed towards discovering gross damage that may be an immediate hazard, including the following:

(a) Distortion of the rope such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion. Loss of rope diameter in a short rope length or unevenness of outer strands should provide evidence that the rope or ropes must be replaced.

(b) General corrosion

(c) Broken or cut strands

(d) Number, distribution and type of visible broken wires (See Section 18.2.2 for further guidance)

(e) Core failure in rotation-resistant ropes. When such damage is discovered, the rope shall be either removed

from service or given an inspection as detailed in Section 18.1.2

**18.1.1.2** Care shall be taken when inspecting sections of rapid deterioration such as flange points, crossover points, and repetitive pickup points.

**18.1.1.3** Care shall be taken when inspecting the following types of rope:

(a) Rotation-resistant rope.

(b) Boom hoist rope.

**18.1.2 Periodic Inspection. -**

**18.1.2.1** There shall be periodic inspections performed at least annually. The inspection frequency shall be determined by a qualified person and shall be based on such factors as expected rope life as determined by experience on the particular installation or similar installations, severity of the environment, percentage of capacity lifts, frequency rates of operation, and exposure to shock loads. Inspections need not be at equal calendar intervals and should be more frequent as the rope approaches the end of its useful life.

**18.1.2.2** In the event a periodic inspection is not feasible within a 12-month period due to existing set-up and configuration of the equipment or due to site conditions, such periodic inspection shall be performed as soon as it becomes feasible but no longer than an additional 6 months for running ropes and, for standing ropes, at the time of disassembly. Written notification and approval of the commissioner must be

obtained prior to extending the use of the rope beyond the 12-month inspection period.

**18.1.2.3** Periodic inspections shall be performed by a qualified person. This inspection shall cover the entire length of rope. Only the surface wires of the rope shall be inspected. Any deterioration resulting in an appreciable loss of original strength shall be noted and determination made as to whether further use of the rope would constitute a hazard. The periodic inspection shall include examination of the following:

- (a) points listed in Section 18.1.1.1
- (b) reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.
- (c) severely corroded or broken wires at end connections
- (d) severely corroded, cracked bent, worn or improperly applied end connections

**18.1.2.4** Care shall be taken when inspecting sections of rapid deterioration, such as the following:

- (a) sections in contact with saddles, equalizer sheaves, or other sheaves where rope travel is limited
- (b) sections of the rope at or near terminal ends where corroded or broken wires may protrude.

**18.1.2.5** All rope that has been idle for a period of six months or more shall be given a periodic inspection before it is placed into service.



## **18.2 Rope Replacement. -**

**18.2.1** When a rope reaches any one of the specified removal criteria, it may be allowed to operate to the end of the work shift, based on the judgement of a qualified person. The rope shall be replaced after that work shift, at the end of the day, or at the latest time prior to the equipment being used by the next work shift.

**18.2.2** Removal criteria for rope replacement shall meet manufacturer's specification or as follows:

### **(a) Broken Wires**

(1) in running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay.

(2) In rotation-resistant ropes, two randomly distributed broken wires in six diameters or four randomly distributed broken wires in 30 rope diameters.

(3) One outer wire broken at the point of contact with the core rope that has worked its way out of the rope structure and protrudes or loops out from the rope structure. Additional inspection of this section is required.

(4) Kinking, crushing, birdcaging, or any other damage resulting in distortion of the rope structure.

(5) Evidence of heat damage from any cause

App. 386

(6) Reductions from nominal diameter of more than the following:

(a)  $1/64$  in. for diameters up to and including  $5/16$  in.

(b)  $1/32$  in. for diameters up to and including  $1/2$  in.

(c)  $3/64$  in. for diameters up to and including  $3/4$  in.

(d)  $1/16$  in. for diameters up to and including  $1\ 1/8$  in.

(e)  $3/32$  in. for diameters up to and including  $1\ 1/2$  in.

(7) In standing ropes, more than two broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection.

**18.2.3** Replacement rope shall have strength rating at least as great as the original rope furnished or recommended by the crane manufacturer. Any deviation from the original size, grade, or construction shall be specified by the rope manufacturer, the crane manufacturer, or a qualified person.

**18.2.4** Discarded rope shall not be used for slings.

### **18.3 Rope Maintenance.-**

18.3.1 Rope shall be stored to prevent damage or deterioration.

18.3.2 Unreeling or uncoiling of rope shall be done as recommended by the rope manufacturer and with extreme care to avoid kinking or inducing a twist.

18.3.3 Before cutting a rope, seizings shall be placed on each side of the place where the rope is to be cut to prevent unlaying of the strands. On preformed rope, one seizing on each side of the cut is required. On non-preformed ropes of 7/8 inch diameter or smaller, two seizings on each side of the cut are required, and for non-preformed rope of one inch diameter or larger, three seizings on each side of the cut are required.

18.3.4 During installation care shall be observed to avoid dragging of the rope in dirt or around objects which will scrape, nick, crush, or induce sharp bends in it.

18.3.5 Rope should be maintained in a well lubricated condition. It is important that lubricant applied as part of a maintenance program shall be compatible with the original lubricant and to this end the rope manufacturer should be consulted. Those sections of rope which are located over sheaves or otherwise hidden during inspection and maintenance procedures require special attention when lubricating rope. The object of rope lubrication is to reduce internal friction and to prevent corrosion. Periodic field lubrication is particularly important for non-rotating rope.

**19.0 Safety Devices Required.** - All cranes and derricks shall be equipped with safety devices as provided herein, except equipment used exclusively for pile driving, clamshell and dragline used for excavation. The commissioner shall approve these safety devices.

**19.1 Indicators or Limiters.** - All mobile cranes with a maximum rated capacity of 3 tons or more shall be equipped with a load indicator, rated capacity indicator, or a rated capacity (load) limiter.

19.1.1 Cranes with a total boom length including jibs and any other extensions not exceeding 150 feet shall be exempt.

19.1.2 Cranes manufactured before December 30, 1993 shall be exempt. The margin of stability for determination of load ratings of these cranes shall be established at 75 percent of the load, which will produce a condition of tipping or balance with the boom in the least stable direction relative to the mounting where overturning stability governs the lifting performance.

19.1.3 Cranes shall have a radius or boom angle indicator provided in conjunction with a load indicator.

**19.2 Anti-Two Blocking Features.** - All mobile cranes with a maximum rated capacity exceeding one ton manufactured after February 28, 1992, shall be equipped with anti-two-blocking features as follows:

(a) Telescopic Boom Cranes shall have an anti-two-block device for all points of two-blocking that

automatically prevents damage from contact between the load block, overhaul ball, or similar component, and the boom and/or jib tip.

(b) Lattice Boom Cranes shall have an anti-two-block device for all points of two-blocking that either automatically prevents damage from contact between the load block, overhaul ball, or similar component, and the boom and/or jib tip or warns the operator in time for the operator to prevent two-blocking.

**19.3 Additional Safety Devices Required.** - All mobile cranes with a maximum rated capacity exceeding one ton shall be equipped with the following additional safety devices:

(a) A deadman control on the control levers in the cab or crane operator's station, where the crane is electrically powered.

(b) An effective audible warning and operating signal on the outside of the cab.

(c) Boom stops and boom hoist safety shutoffs. However, boom stops shall not be required for telescoping booms.

(d) An indicator for leveling the crane.

(e) Hoist drum rotation indicator if the drum is not visible from the operator's station.

**19.4 Malfunctioning Safety Devices.** - The load indicator, rated capacity indicator, rated capacity (load)

## App. 390

limiter, hoist drum rotation indicator, and the anti-two blocking devices shall also be known as operational aids, which provide information to facilitate the operation of a crane or that take control of particular functions without action of the operator when a limiting condition is sensed. When any of these operational aids are inoperative or malfunctioning, the following alternative measures shall be implemented to allow continued use of the crane:

(a) Load indicator, Rated capacity indicator or Rated Capacity (Load) Limiter: The weight of the load shall be determined from a reliable source (such as the manufacturer's equipment specification), by a reliable calculation method (such as calculating a steel beam from measured dimensions and a known per foot weight) or by other equally reliable means before the load is hoisted. To ensure that the weight of the load does not exceed the crane ratings at the maximum radius at which the load is to be handled, the radius shall be determined through the use of a boom angle indicator, radius indicator or by measurement.

(b) Hoist drum rotation indicator: Mirrors and/or remote video cameras and displays shall be provided so that the operator can see the drum.

(c) Anti-two-block device: The cable shall be clearly marked (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking or an additional signal person shall be

utilized to monitor the position of the load block or overhaul ball.

Recalibration or repair of the safety device shall be accomplished as soon as is reasonably possible, as determined by a qualified person.

**19.5 Tower Cranes and Climber Cranes.** - All tower cranes and climber cranes excluding truck-mounted tower cranes shall have the following:

- (a) Warning light activated at 100% allowable overturning moment,
- (b) Acoustic signal sounding at 105% allowable overturning moment,
- (c) Automatic stop if 110% allowable overturning moment is reached,
- (d) Automatic stop if load exceeds maximum rated load in high gear,
- (e) Automatic stop if load exceeds maximum rated load in intermediate gear,
- (f) Automatic stop if load exceeds maximum rated load in low gear,
- (g) Predeceleration before top position of the hook,
- (h) Limit switch for top position of the hook,
- (i) Predeceleration before low position of the hook,

- (j) Limit switch for the trolley traveling out,
- (k) Limit switch for the trolley traveling in,
- (l) Acceleration limit on the hoisting movement,
- (m) Acceleration limit on the swing movement,
- (n) Acceleration limit on the trolley movement, and
- (o) Deadman control on both control levers in box.

**19.6 Derricks.-**Safety devices for derricks shall be approved by the commissioner and shall be installed within six months after said devices are accepted. However, where electrically powered, a deadman control on control levers shall be installed prior to applying for a certificate pursuant to section 27-1057 of the Administrative Code.

**21.0 Characteristics and Special Requirements for Derricks.-**

**21.1 Load ratings.-**

**21.1.1 Rated load marking.-**

(a) For derricks, a substantial, durable and clearly legible load rating chart shall be provided for each particular installation. The rating chart shall be securely affixed where it is visible to personnel responsible for the operation of, the equipment. The chart shall include but not be limited to the following data:



## App. 393

1-manufacturer's load ratings as approved by the department at corresponding ranges of boom angle or operating radii.

2-specific lengths of components on which the load ratings are based.

3-required parts for hoist reeving.

4-size and construction of all ropes shall be shown either on the rating chart or in the operating manual.

(b) For all other derricks, the manufacturer shall provide sufficient information from which capacity charts can be prepared and approved by the department for the particular installation. The capacity charts shall be located either at the derrick or the job site office.

### **21.2 Construction.-**

21.2.1 General.-Derricks shall be constructed to adequately meet all stresses imposed on all members and components.

21.2.2 Guy derricks.-

(a) The minimum number of guys is six. Preferably, the guys should be equally spaced around the mast.

(b) The manufacturer shall furnish complete information recommending:

1- the number of guys.

App. 394

2- the spacing around the mast;

3- the maximum vertical slope and initial tension or sag of all guys;

4- the size and construction of rope to be used in each.

(c) The mast base shall permit free rotation of the mast with allowance for slight tilting of the mast caused by guy slack.

(d) The mast cap shall:

1 - permit free rotation of the mast;

2 - adequately withstand tilting and cramping action imposed by the guy loads;

3 - be secured to the mast to prevent disengagement during erection;

4 - be provided with means for attachment of guy ropes.

21.2.3 Stiff leg derrick. -

(a) The mast shall be supported in the vertical position by two stiff legs one end of each being connected to the top of the mast and the other end securely anchored. The stiff legs shall be capable of withstanding the loads imposed by the boom at any point within its range of swing.

(b) The mast base shall:

- 1 - permit free rotation of mast;
- 2 - permit slight inclination of the mast without binding;
- 3 - provide means to prevent the mast from lifting out of its socket when the mast is in tension.

(c) The stiff leg connecting member at the top of the mast shall:

- 1 - permit free rotation of the mast;
- 2 - adequately withstand the loads imposed by the action of the stiff legs;
- 3 - be so secured as to oppose lift off forces at all times.

### **21.3 Ropes and reeving accessories.-**

#### **21.3.1 Guy ropes.-**

- (a) Guy ropes shall be of suitable size, grade and construction to withstand the maximum load imposed.
- (b) The nominal breaking strength of each rope shall be no less than three times the load applied to the rope.
- (c) Tie downs or kicker devices which may be easily loosened shall have locknuts or other suitable provision to prevent loosening.

App. 396

21.3.2 Boom hoist ropes.-

- (a) Boom hoist ropes shall be of suitable size, grade and construction to withstand the maximum load imposed.
- (b) The live rope reeving system in a boom suspension shall withstand the maximum load imposed and be of sufficient length to permit lowering the boom point to horizontal position with at least three full wraps of rope remaining on the hoist drum.
- (c) The nominal breaking strength of the most heavily loaded rope in a system shall be no less than three and a half times the loads applied to that rope.

21.3.3 Main hoist ropes.-

- (a) Main hoist ropes shall be of a suitable size and construction to withstand the maximum load imposed.
- (b) Ropes in the main hoisting system shall be of sufficient length for the entire range of movement specified for the application with at least three full wraps of rope on the hoist drum at all times.
- (c) The nominal breaking strength of the most heavily loaded rope in a system shall be no less than three and a half times the load applied to that rope.

21.3.4 Reeving accessories.-

- (a) Socketing shall be done in the manner specified by the manufacturer of the assembly.
- (b) Rope end shall be anchored securely to the drum.

App. 397

(c) Eyes shall be made in an approved manner and rope thimbles should be used in the eye.

(d) U-bolt clips shall have the U-bolt on the dead or short end, and the saddle on the live or long end of the rope. Spacing and number of all types of clips shall be in accordance with the clip manufacturer's recommendation and submitted to the department. Clips shall be drop-forged steel in all sizes manufactured commercially. When a newly installed rope has been in operation for an hour, all nuts on the clip bolts shall be retightened, and they should be checked for tightness at frequent intervals thereafter.

(e) Swaged, compressed, or wedge-socket fittings shall be applied as recommended by the rope, derrick, or fitting manufacturer.

(f) Where a half wedge socket is used it shall be of a positive locking type.

(g) If a load is supported by more than one rope, the tension in the parts shall be equalized.

21.3.5 Sheaves.-

(a) Sheave grooves shall be smooth and free from surface defects which could cause rope damage. The cross sectional radius at the bottom of the groove should be such as to form a close fitting saddle for the size rope used and the sides of the groove should be tapered outwardly to facilitate entrance of the rope into the groove. Flange corners should be rounded and the rims should run true about the axis of rotation.

## App. 398

(b) Sheaves carrying ropes which can be momentarily unloaded shall be provided with close fitting guards or other suitable devices to guide the rope back into the groove when the load is applied again.

(c) The sheaves in the lower load block shall be equipped with close-fitting guards that will prevent ropes from becoming fouled when the block is lying on the ground with ropes loose.

(d) Means should be provided, if necessary, to prevent chafing of the ropes.

(e) All running sheaves shall be equipped with means for lubrication. Permanently lubricated, sealed and/or shielded bearings shall be acceptable.

(f) Boom and hoisting sheaves shall have pitch diameters not less than eighteen times the nominal diameter of the rope used.

(g) Boom point sheaves should be provided with suitable guides to limit the offlead angle of the rope when entering the grooves from either side.

### **21.4 Anchoring and guying.-**

#### **21.4.1 Guy derricks.-**

(a) The mast base shall be securely anchored. Maximum horizontal and downward vertical thrusts encountered when handling rated loads with the particular guy slope and spacing stipulated for the application are among the design factors for which provision must be made.

(b) The guys shall be secured to the ground or other firm anchorage. Maximum horizontal and vertical pulls encountered while handling rated loads with the particular guy slope and spacing stipulated for the application are among the factors for which provision must be made.

#### 21.4.2 Stiff leg derricks.-

(a) The mast base shall be securely anchored. Maximum horizontal and upward and downward vertical thrusts encountered while handling rated loads stipulated for the application with the particular stiff-leg spacing and slope are among the factors for which provision must be made.

(b) The stiff legs shall be securely anchored. Maximum horizontal and vertical upward and downward thrusts encountered while handling rated loads with the particular stiff-leg arrangement stipulated for the application are among the factors for which provision must be made.

### 21.5 Hoist.-

21.5.1 The hoist shall be suitable for the derrick work intended and shall be securely anchored to prevent displacement from the imposed loads.

21.6 Cranes manufactured prior to April 1, 1970 shall be modified to conform to the provisions of 20.1.1(d) and (f), 20.1.2(h) and (i), 20.2.3, 20.3.1(b) and (c), 20.3.2(a)(2), 20.4.5, 20.5.1(b) and derricks manufactured prior to April 1, 1970 shall be modified to conform to the provisions of 21.3.5(f), unless it can be

App. 400

shown to the satisfaction of the commissioner that the crane can not feasibly or economically be altered to comply.

**22.0 Operation Cranes and Derricks. -**

**22.1 Operators.-**

22.1.1 Cranes and derricks shall be operated only by the following persons:

(a) Persons licensed as operators by the department of buildings in accordance with section B26-5.0.

(b) Learners in the presence of and under the direct supervision of a licensed operator.

22.1.2 No person other than those listed under paragraph 22.1.1 above and persons such as oilers and supervisors, whose duties require them to do so, shall enter the cab of a crane and then only in the performance of his duties and with knowledge and consent of the operator.

**22.2 Operating practices.-**

22.2.1 The operator shall not engage in any practice which will divert his attention while actually engaged in operating the crane or derrick hoist.

22.2.2 The operator shall respond to signals only from the appointed signal men.

22.2.3 The operator shall be responsible for the operation of the crane or derrick hoist.



App. 401

22.2.4 For mobile cranes, the warning signal shall be sounded each time before on-site traveling and intermittently during such travel, particularly when approaching workmen.

22.2.5 Before leaving his crane or derrick unattended, the operator shall:

- (a) Land any attached load, bucket, lifting magnet, or other device.
- (b) Disengage clutches.
- (c) Set travel, swing, boom brakes and other locking devices.
- (d) Put controls in the "off" position.
- (e) Stop the engine.
- (f) Secure mobile cranes against accidental travel.
- (g) Lock and secure the equipment against unauthorized operation.

22.2.6 On leaving a mobile crane overnight, ground chocks shall be set and crane booms shall be lowered to ground level or otherwise fastened securely against displacement by wind loads or other external forces.

22.2.7 If there is a warning sign on the switch or engine starting controls, the operator shall not close the switch or start engine until the warning sign has been removed by the person placing it there.

App. 402

22.2.8 Before closing the switch, or starting the engine, the operator shall see to it that all controls are in the “off “ position and all personnel are in the clear.

22.2.9 If power fails during operation, the operator shall:

- (a) Set all brakes and locking devices.
- (b) Move all clutch or other power controls to the “off” position.
- (c) Communicate with the appointed individual in charge of operations.
- (d) If practical, the suspended load should be landed under brake control.

22.2.10 The operator shall familiarize himself with the equipment and its proper care. If adjustments or repairs are necessary, or any defects are known he shall report the same promptly to his employer or other person responsible for the equipment and shall also notify the next operator of the defects upon changing shifts.

22.2.11 All controls shall be tested by the operator at the start of a new shift. If any controls do not operate properly, they shall be adjusted or repaired before operations are begun.

22.2.12 Booms of mobile cranes which are being assembled or disassembled on the ground with or without support of the boom harness (equalizing sheaves, bridal and boom pendants) should be securely

supported by proper blocking to prevent dropping of the boom sections.

**23.0 Handling the Load.-No crane or derrick shall be loaded beyond the rated load.**

**23.1 Size of load.-** On all operations involving cranes or derricks which are not equipped with those safety devices which make use of load measuring systems, there shall be a competent appointed individual assigned on a full-time basis to be responsible for determining the magnitude of loads to be lifted or lowered. The operator shall not make a lift unless he has first determined the weight of the load or is informed of such weight by the appointed person responsible for the operation.

**23.2 Attaching the load.-**

23.2.1 The hoist rope shall not be wrapped around the load.

23.2.2 The load shall be attached to the hook by means of slings or other approved devices.

**23.3 Moving the load.-**

23.3.1 The appointed individual directing the lift shall see that:

(a) In the case of a mobile crane, the crane is level and where necessary, chocked properly.

App. 404

(b) The load is well secured and properly balanced in the sling or lifting device before it is lifted more than a few inches.

23.3.2 Before starting to hoist, he shall take care that:

- (a) Hoist ropes are not kinked.
- (b) Multiple part lines are not twisted around each other.
- (c) The hook is brought over the load in such a manner as to prevent swinging.
- (d) If there is a slack rope condition, the rope is properly seated on the drum and in the sheaves.

23.3.3 During hoisting, care should be taken that:

- (a) There is no sudden acceleration or deceleration of the moving load.
- (b) The load does not contact any obstructions.

23.3.4 Side loading of booms shall be limited to freely suspended loads. Cranes shall not be used for dragging loads sideways. Derricks shall not be used for side loading.

23.3.5 The operator shall not lift, lower, swing or travel while any person is on the load or hook<sub>[1]</sub> unless notification is filed with the Department pursuant to Section 23.6 of this title. The operator shall not carry loads over people or over any occupied building <sub>[1]</sub>

App. 405

unless the top two floors are vacated or overhead protection with a design live load of 300 psf is provided.

23.3.6 On truck cranes, loads shall be lifted over the front area only as recommended by the manufacturer and submitted to the department of buildings.

23.3.7 The operator shall test the brakes each time a load approaching the rated load is handled by raising it a few inches and applying the brakes.

23.3.8 For mobile cranes, outriggers shall be used when the load to be handled at that particular radius exceeds the rated load without outriggers as given by the manufacturer for that crane and approved by the department of buildings.

23.3.9 Neither the load nor the boom shall be lowered below the point where less than three full wraps of rope remain on their respective drums.

23.3.10 When two or more cranes are used to lift one load, one appointed person shall be responsible for the operation. He shall analyze the operation and instruct all personnel involved in the proper positioning, rigging of the load, and the movements to be made.

23.3.11 In transit, the following additional precautions for mobile cranes shall be exercised:

(a) The boom shall be carried in line with the direction of motion.

(b) The superstructure shall be secured against rotation. When negotiating turns or when the boom is

App. 406

supported on a dolly, the superstructure may be rotated by a licensed crane operator only.

(c) The empty hook shall be lashed or otherwise restrained so that it cannot swing freely.

23.3.12 Before traveling a crane with a load, proposed travel should be shown on a plan of operation and approved by the department. Such data shall be filed with an application for on-site inspection.

23.3.13 A crane shall not be traveled with the boom so high that it may bounce back over the cab.

23.3.14 When rotating the crane or derrick, sudden stops shall not be made. Rotational speed shall be such that the load does not swing out beyond the radii at which it can be controlled. A tag or restraint line shall be used when rotation of the load is hazardous.

23.3.15 When a crane is to be operated at a fixed radius, the boom hoist pawl or other positive locking device shall be engaged.

23.3.16 Use of winch heads:

(a) Ropes shall not be handled on a winch head without knowledge of the operator.

(b) While a winch is being used, the operator shall be within convenient reach of the power unit control lever.

### **23.4 Holding the load.-**

23.4.1 The operator shall not leave his position at the controls while the load is suspended.

23.4.2 People shall not be permitted to stand or pass under a load.

23.4.3 If the load must remain suspended for any considerable length of time, the operator shall hold the drum from rotating in the lowering direction by activating the positive controllable means at the operator's station.

23.4.4 In all cases, when booms are raised or lowered from the horizontal, load blocks including hooks and weight balls shall be left on the ground or deposited to the ground before raising or lowering booms.

### **23.5 Securing derrick booms.-**

23.5.1 Dogs, pawls, or other positive braking mechanism on the hoist shall be engaged. When not in use, the derrick boom shall:

- (a) Be laid down;
- (b) Be secured to a stationary member, as nearly under the head as possible, by attachment of a sling to the load block; or
- (c) Hoisted to a vertical position and secured to the mast.

**23.6 Hoisting Personnel.** - Written notification shall be submitted to the commissioner at least three (3) business days prior to the date the hoisting equipment may be used to move personnel. In addition to the requirements of this section, the applicant shall also comply with all applicable OSHA requirements.

**23.6.1** The applicant shall be an engineer or a licensed master rigger. However, where the boom length, including jibs and any other extensions, is greater than 250 ft, the applicant shall be an engineer.

**23.6.2** The notification shall include the following:

- (a) A description of work,
- (b) The start date and duration of the work,
- (c) Manufacturer's information on the personnel platform used to perform the work,
- (d) The number of people who will be on the platform,
- (e) The actual pick load and the maximum radius of the pick,
- (f) The allowable pick load for maximum radius from load chart approved by the commissioner,
- (g) Description of how the person/people on the platform and the hoisting machine operator will communicate,
- (h) Designation of Site Safety coordinator,



App. 409

- (i) Equipment user's company name, and address, and
- (j) The name and title of principal from the equipment user company.

**23.6.2.1** Where the applicant is an engineer, the request shall also include a copy of the Certificate of On-Site Inspection.

**23.6.2.2** Where the applicant is a master rigger, the request shall also include:

- (a) The make, model number and Certificate of Operation of the Hoisting Machine
- (b) A sketch or description of the foundation for the hoisting machine

**23.6.3** Exception: If the boom length, including jibs and any other extensions, is less than 100 ft and the lift is supervised by a master rigger, written notification is not required.

**24.0 Signals.-**

24.1 A signalman shall be provided when the point of operation is not in full and direct view of the operator unless an approved mechanical signaling or control device is provided for safe direction of the operator.

24.2 Only persons who are dependable and fully qualified by experience with the operation shall be used as signalmen.

## App. 410

24.3 A signalman or other appropriate controls shall be provided when operations or equipment on or adjacent to a highway create a traffic hazard.

24.4 Signalmen shall wear high visibility gloves.

24.5 A uniform hand signal system shall be used on all operations of a similar nature. The system in use by the U.S. Corps of Engineers (EM 385-11) may be used as the model.

24.6 Manual hand signals may be used when the distance between the operator and the signalman is not more than 60 feet, but manual hand signals shall not be used when atmospheric conditions prevent clear visibility to the operator.

24.7 Mechanical signal systems shall be protected against unauthorized use, breakage, weather or obstruction which will interfere with safe operation. In the event of any malfunction, all motion shall be stopped immediately.

### **25.0 Miscellaneous.-**

**25.1 Ballast or counterweight.** - Cranes shall not be operated without the full amount of any ballast or counterweight in place as specified by the maker, and approved by the department.

**25.2 Wind speed limitations.** - No crane or derrick operator shall start an operation when the wind speed exceeds 30 m.p.h., or when the wind is predicted to reach 30 m.p.h. before the operation can be completed. The U.S. weather bureau data from the nearest

## App. 411

reporting station may be used for the determination of wind speed.

### **25.3 Operating near electric power lines. -**

25.3.1 No crane or derrick shall be operated in such a location that any part of the machine or of its load shall at any time come within 15 feet of an energized power line.

25.3.2 Before the commencement of operations near electrical lines, the appointed person responsible for the operation shall notify the owners of the lines or their authorized representatives providing them with all pertinent information and requesting their cooperation.

25.3.3 Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities certify that it is not an energized line.

### **25.4 Electrical equipment.-**

#### 25.4.1 General.-

(a) Wiring and equipment shall comply with the electrical code of the City of New York.

(b) The voltage used on control circuits shall not exceed 750 volts.

25.4.2 Equipment.-

- (a) Electric equipment shall be so located or enclosed that live parts will not be exposed to accidental contact.
- (b) All motor, controller and switch frames shall be grounded.
- (c) Electric equipment shall be thoroughly protected from dirt, grease and oil, and where exposed to the weather, shall be thoroughly protected therefrom.
- (d) Guards for live parts shall be substantial and so located that they cannot be deformed so as to make contact with the live parts.
- (e) Name plates shall not be removed.

25.4.3 Controllers.-

- (a) Each cage operated crane and derrick shall be provided with a device which will disconnect all motors from the line on failure of power and will not permit any motor to be restarted until the controller handle is brought to the "off " position, or a reset switch or button is operated.
- (b) Lever operated controllers shall be provided with a notch or latch which in the "off" position prevents the handle from being inadvertently moved to the "on" position.
- (c) The controller operating handle shall be located within convenient reach of the operator.

## App. 413

(d) As far as practicable, the movement of each controller handle shall be in the same general directions as the resultant movements of the load.

(e) For floor operated cranes and derricks, the controller or controllers, if rope operated, shall automatically return to the "off" position when released by the operator.

25.4.4 Grounding.-Each crane, which may be operated in the vicinity of a live power line, shall be effectively grounded as hereinafter provided. The crane shall be provided with a permanent clamp or other means for convenient and effective attachment of a grounding conductor. The cable connecting the clamp to the ground shall be equivalent to a No. 2 AWG or larger single conductor, superflexible, rope stranded copper, composed of not less than 1,600 individual wires, with 600 volt covering for mechanical protection and with terminal parts that insure a good connection with hand type screw clamps. An effective ground shall be one having a resistance of 25 ohms or less, which shall be measured, or a connection to a continuous underground metallic water piping system.

## **25.5 Demolition.-**

25.5.1 Crane or derrick operation when used for mechanical demolition shall comply with section C26-1905.4(d) of the building code and, in addition, a crane or derrick operating with a demolition ball shall meet the following requirements:

## App. 414

- (a) The weight of the demolition ball shall not exceed fifty percent of the rated capacity of the boom length at its maximum radius.
- (b) The swing of the boom shall not exceed thirty degrees from the centerline, front to back of the crane mounting.
- (c) The load line and attachment of the demolition ball to the load line shall be checked at least twice daily.
- (d) Truck cranes without outriggers extended shall not be used to swing a demolition ball.

### **26.0 Storage.-**

26.1 Necessary clothing and personal belongings shall be stored in or about the crane or derrick in such a manner as to not interfere with access or operation.

26.2 Tools, oil cans, waste, extra fuses, and other necessary articles shall be stored in a tool box and shall not be permitted to lie loose in or about the cab or cage.

### **27.0 Refueling.-**

27.1 Refueling shall comply with section C26-1909.1(c).

27.2 Machines shall not be refueled with the engine running.

### **28.0 Fire Extinguishers.-**

28.1 A carbon dioxide, dry chemical or equivalent fire extinguisher shall be kept in the cab or in the vicinity of the crane or derrick.

28.2 Operating and maintenance personnel shall be familiar with the use and care of the fire extinguishers provided.

**29.0 Filing for Prototype Equipment.**-Where the equipment is a duplicate of equipment previously filed with design information and approved by the department, the previous approval shall be accepted for the design. Evidence shall be submitted that the welding and other manufacturing processes affecting the structural integrity of the crane were performed in accordance with applicable specifications and that required controls were maintained and tests performed.

**30.0 Waiver of Modification of Rules and Regulations.**-The commissioner may, at his discretion, modify or waive any of the foregoing requirements where practical difficulties in complying with particular sections exist and the public safety is not endangered thereby.

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**APPENDIX I**

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**UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF FLORIDA**

**Case No. 08-21274-CIV-UNGARO**

**[Filed January 14, 2009]**

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ASSOCIATED BUILDERS AND	)
CONTRACTORS FLORIDA EAST	)
COAST CHAPTER, <i>et al.</i> ,	)
_____Plaintiffs,	)
v.	)
MIAMI-DADE COUNTY,	)
_____Defendant.	)
_____	/

**ORDER ON MOTIONS FOR  
SUMMARY JUDGMENT**

THIS CAUSE is before the Court upon Plaintiffs' Motion for Summary Judgment, filed July 15, 2008 (D.E. 43). Defendant responded in opposition and cross-motioned for summary judgment on August 8, 2008 (D.E. 55), to which Plaintiff replied on August 21, 2008 (D.E. 62). Defendant then replied in support of its Cross-Motion on September 2, 2008 (D.E. 63). The matters are ripe for disposition.



THE COURT has considered the motions and the pertinent portions of the record and is otherwise fully advised in the premises.

### **Background**

Plaintiffs are four separate trade associations in the construction, crane and crane services industries, and are non-profit corporations incorporated under the laws of the State of Florida.<sup>1</sup> (Plaintiffs' Statement of Undisputed Facts (D.E. 43-2, "Pl's SOF") ¶ 1; County's Statement of Facts (D.E. 56, "County's SOF") ¶ 1.) Defendant Miami-Dade County ("County") is a political subdivision of the State of Florida. (Pl's SOF ¶ 2; County's SOF ¶2.)

Plaintiffs filed suit against the County on May 1, 2008, seeking declaratory and injunctive relief on the basis that the County's Crane Ordinance (defined below) is preempted by the Occupational Safety and Health Act of 1970, 84 Stat. 1590, 29 U.S.C. § 651 *et seq.* ("OSH Act") and the standards promulgated by the Occupational Safety and Health Administration ("OSHA"). Plaintiffs also alleged in their Complaint that the Crane Ordinance is unconstitutional because it violates Plaintiffs' rights to procedural and substantive due process under the United States and Florida Constitutions, and that the Crane Ordinance is unconstitutional under the dormant commerce clause.

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<sup>1</sup> Plaintiffs are as follows: the Associated Builders and Contractors Florida East Coast Chapter, Inc.; the South Florida Associated General Contractors of America, Inc.; the Florida Crane Owners Council; and the Construction Association of South Florida.

### **A. The Crane Ordinance**

On March 28, 2008, the County enacted the Miami-Dade County Ordinance No. 08-34, titled “Ordinance Relating to the Safety of Cranes and Other Hoisting Equipment; Providing for Education and Certification of Operators; Establishing Standards for Hurricane Preparedness; Providing for Enforcement; Creating Chapter 8E of the Code; Providing Severability, Inclusion in the Code, and an Effective Date” (the “Crane Ordinance”). (Pl’s SOF ¶ 3; County’s SOF ¶ 3.)

The Crane Ordinance’s “Whereas Clause” states that the County is “in the midst of an unprecedented construction boom,” that “more than 100 major projects under construction in [the County] are utilizing heavy hoisting equipment such as tower cranes,” that as a result there have been an “increased number of tragic accidents and fatalities,” and that according to statistics from OSHA, there were fourteen construction fatalities in South Florida from January 2006 to May 2006, which is the approximate number of construction fatalities for the entire year of 2005. The Crane Ordinance’s “Whereas Clause” further states that the County is exposed to “the onslaught of hurricanes of increasing frequency in recent seasons,” and that the substantial number of cranes and heavy hoisting equipment in the County poses serious concerns of public safety during hurricane season; that other major metropolitan areas have local laws that govern crane operations and safety; that a Committee composed of equipment owners, manufacturers, operators and other members of the construction industry has served as an advisory board to the County’s efforts to enhance safety regulations; and that the Committee has recommended

the regulations contained in the Crane Ordinance “as necessary and desirable for the protection of public health and safety.”

The stated purpose of the Crane Ordinance is to “provide a uniform standard for the construction, installation, operation and use of Hoisting Equipment,[<sup>2</sup>] for the inspection and certification of Hoisting Equipment, and for the education and certification of Hoisting Equipment operators.” (Crane Ord. Sec. 1, § 8E-2.)

In particular, the Crane Ordinance sets forth standards for tower crane manufacture, installation, and use<sup>3</sup> (*id.* at § 8E-4); mobile crane manufacture, installation and use<sup>4</sup> (*id.* at § 8E-5); and personnel and

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<sup>2</sup> “Hoisting Equipment” is defined as “mast climbing work platforms, tower cranes, mobile cranes and personnel and material hoists.” (Crane Ord. Sec. 1, § 8E-1(c).)

<sup>3</sup> Specifically, with respect to the manufacture, installation, and use of tower cranes, the Ordinance provides that the following standards are applicable: (a) the equipment manufacturers (O.E.M.) specifications; (b) the mandatory rules contained within the applicable ASME B30 standard (ASME B30.3); (c) the most current applicable OSHA standards including 29 C.F.R. § 1926.550; and (d) the SEI/ASCE-7 wind load standards, which may be reduced at the discretion of the Building Official on a site-by-site basis. (Crane Ord. Sec. 1, § 8E-4.)

<sup>4</sup> With respect to the manufacture, installation, and use of mobile cranes, the Ordinance provides that the applicable standards are (a) the O.E.M. specifications; (b) the mandatory rules contained within the applicable ASME standard (ASME B30.5); and (c) the most current OSHA standards applicable to cranes, including 29 C.F.R. §§ 1926.550 and 1910.80. (Crane Ord. Sec. 1, § 8E-5.)

material hoist manufacture, installation and use<sup>5</sup> (*id.* at § 8E-6). The standards set forth in the Crane Ordinance for the manufacture, installation and use of tower cranes and personnel and material hoists include the wind load standards contained within SEI/ASCE-7 for High Velocity Hurricane Zones as applied to the crane base foundation, the tie-ins to the building, the free-standing height and the height above the top tie-in (for tower cranes) and as applied to the hoist tie-ins and floor shoe connections (for hoists).<sup>6</sup> (*Id.* at §§ 8E-4(d) & 8E-6-(d).)

The Crane Ordinance also promulgates (i) standards for tower crane and mobile crane operator qualifications and certifications (*id.* at § 8E-9); (ii) signal person qualifications and certifications (*id.* at § 8E-10(b)); and (iii) requirements for crane to crane

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<sup>5</sup> With respect to the manufacture, installation, and use of personnel and material hoists, the Ordinance provides that the applicable standards are (a) the O.E.M. specifications; (b) the mandatory rules contained within the applicable ANSI standard (ANSI A10.4); (c) the most current OSHA standards applicable to hoists including 29 C.F.R. § 1926.552; and (d) the SEI/ASCE-7 wind load standards, which may be reduced at the discretion of the Building Official on a site-by-site basis. (Crane Ord. Sec. 1, § 8E-6.)

<sup>6</sup> The Ordinance further provides that in applying the provisions of SEI/ASCE-7 for temporary installations, the design velocity reduction factors contained in SEI/ASCE 37-02 may be considered in factoring the wind speed at the discretion of the Building Official, and that the decision shall be made by the Building Official on a site-by-site basis. (Crane Ord. Sec. 1, §§ 8E-4(d) & 8E-6(d).) The Building Official is to consider such factors as proximity to other structures, density, swing radius of the crane, hoist location, and other safety requirements. (*Id.* at §§ 8E-4(d) & 8E-6(d).)

communications (*id.* at § 8E-10(a)). In addition, the Crane Ordinance establishes requirements for crane siting (*id.* at § 8E-7), and requirements for building permits and inspections relating to construction involving the placement, erection or use of Hoisting Equipment, including requirements for inspection schedules, Hoisting Equipment inspection companies, and individual inspector qualifications and certifications (*id.* at § 8E-8). The Crane Ordinance also sets forth requirements for hurricane preparedness of Hoisting Equipment (*id.* at § 8E-11.)

The Crane Ordinance authorizes the Miami-Dade County Building Code Compliance Office to enforce its provisions through the issuance of civil violations fines, and creates a right of action by the County for injunctive or other available relief where violations of the Ordinance involve damages to the public health and safety. (*Id.* at § 8E-12 & Section 2, § 8CC-10.) Finally, the Crane Ordinance contains a severability provision. (*Id.* at Sec. 3).

The parties do not dispute the fact that the County did not submit a plan or receive approval from OSHA to enact the Crane Ordinance. (Pl's SOF ¶¶ 4-5; County's SOF ¶¶ 4-5.)

## **B. OSHA Regulations**

OSHA has promulgated occupational safety and health standards that apply “to every employment and place of employment of every employee engaged in construction work.” 29 C.F.R. § 1910.12(a). These standards include general requirements for construction work involving cranes and derricks, 29

C.F.R. § 1926.550, and material hoists, personnel hoists, and elevators, 29 C.F.R. § 1926.552. In particular, these two OSHA regulations (29 C.F.R. §§ 1926.550 and 1926.552) require compliance with the manufacturer's specifications and limitations applicable to the operation of all cranes, derricks, hoists, and elevators, and provide that where the manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a qualified engineer competent in the field. 29 C.F.R. §§ 1926.550(a)(1) & 1926.552(a)(1).

Additionally, OSHA regulations set forth requirements for the inspection and certification of crane and hoisting equipment, 29 C.F.R. §§ 1926.550(a)(5)-(6); 1926.550(b)(2); 1926.550(c)(5); 1926.552(c)(15) & 1926.552(c)(17); and the inspection of cranes by incorporating the mandatory rules of the applicable American Society of Mechanical Engineers ("ASME") standard. The OSHA regulations further establish standards for hand signals to crane and derrick operators, 29 C.F.R. § 1926.550(a)(4), and standards for crane operator qualifications and certifications by incorporating the mandatory rules of the applicable ASME standards.

### **C. The Preliminary Injunction and Dismissal of Counts III-V**

Shortly after filing their Complaint, Plaintiffs moved this Court for an emergency preliminary injunction to enjoin the County from enforcing the Crane Ordinance. (D.E. 8.) After conducting a hearing on the matter, the Court made certain findings of fact and conclusions of law, and enjoined the County from

enforcing only those provisions of the Crane Ordinance that the Court deemed to be likely preempted by the OSH Act.<sup>7</sup> (D.E. 27, the “Preliminary Injunction Order”.) Additionally, the Court found that Plaintiffs’ procedural and substantive due process claims and dormant commerce clause claims (Counts III, IV, and V of Plaintiffs’ Complaint) were not ripe for review. Accordingly, the Court granted in part the County’s Motion to Dismiss Plaintiffs’ Complaint (D.E. 28), dismissing Counts III, IV, and V of Plaintiffs’ Complaint. (D.E. 29).<sup>8</sup>

Plaintiffs then filed their instant Motion to for Summary Judgment, wherein they request (i) that the Court permanently sever those portions of the Crane Ordinance found to be preempted by the OSH Act in its Preliminary Injunction Order, and (ii) that the County be permanently enjoined from enforcing those provisions. The County then cross-motined for summary judgment, wherein they seek to preserve their arguments previously raised in opposition to Plaintiffs’ request for preliminary injunctive relief but primarily argue that Crane Ordinance’s “hurricane

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<sup>7</sup> The Court’s Preliminary Injunction Order was entered on May 22, 2008. The County has filed an interlocutory appeal of this Court’s Preliminary Injunction Order. (*See* D.E. 34.) The County’s motion to stay these proceedings and the preliminary injunction pending appeal was denied. (*See* D.E. 47.)

<sup>8</sup> The Court’s Order on the County’s Motion to Dismiss was entered on June 3, 2008.

wind load standard provisions”<sup>9</sup> fall outside the preemptive effect of the OSH Act. (*See* D.E. 55, n.1.) The County maintains that these provisions in particular survive because (i) they are not “occupational regulations,” as they are targeted at public safety rather than worker safety, and, (ii) to the extent that hurricane wind load standard provisions are considered “occupational regulations,” there are no similar federal regulations in effect. Accordingly, the County requests that the Court enter summary judgment in its favor and dissolve the preliminary injunction order to allow the County to enforce the provisions of its Crane Ordinance establishing the hurricane wind load standard.

### **Legal Standard**

Summary judgment is authorized only when the moving party meets its burden of demonstrating that “the pleadings, depositions, answers to interrogatories and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law.” Fed. R. Civ. P. 56. When determining whether the moving party has met this burden, the court must view the evidence and all factual inferences in the light most favorable to the non-moving party. *Adickes v. S.H. Kress & Co.*, 398

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<sup>9</sup> Although the County does not specifically reference which provisions in the Crane Ordinance are the “hurricane wind load standard provisions,” the Court assumes that the County’s is referencing Sections 8E-4(d) and 8E-6(d) of the Crane Ordinance.



U.S. 144, 157 (1970); *Rojas v. Florida*, 285 F.3d 1339, 1341-42 (11th Cir. 2002).

The party opposing the motion may not simply rest upon mere allegations or denials of the pleadings; after the moving party has met its burden of proving that no genuine issue of material fact exists, the non-moving party must make a sufficient showing to establish the existence of an essential element to that party's case and on which that party will bear the burden of proof at trial. *Celotex Corp. v. Catrell*, 477 U.S. 317 (1986); *Poole v. Country Club of Columbus, Inc.*, 129 F.3d 551, 553 (11th Cir. 1997); *Barfield v. Brierton*, 883 F.2d 923, 933 (11th Cir. 1989).

If the record presents factual issues, the court must not decide them; it must deny the motion and proceed to trial. *Envntl. Def. Fund v. Marsh*, 651 F.2d 983, 991 (5th Cir. 1981).<sup>10</sup> Summary judgment may be inappropriate even where the parties agree on the basic facts, but disagree about the inferences that should be drawn from these facts. *Lighting Fixture & Elec. Supply Co. v. Cont'l Ins. Co.*, 420 F.2d 1211, 1213 (5th Cir. 1969). If reasonable minds might differ on the inferences arising from undisputed facts then the court should deny summary judgment. *Impossible Elec. Techniques, Inc. v. Wackenhut Protective Sys., Inc.*, 669 F.2d 1026, 1031 (5th Cir. 1982); see *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986) (“[T]he dispute

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<sup>10</sup> Decisions of the United States Court of Appeals for the Fifth Circuit entered before October 1, 1981, are binding precedent in the Eleventh Circuit. See *Bonner v. City of Prichard*, 661 F.2d 1206 (11th Cir. 1981).

about a material fact is ‘genuine,’ . . . if the evidence is such that a reasonable jury could return a verdict for the nonmoving party.”).

Moreover, the party opposing a motion for summary judgment need not respond to it with evidence unless and until the movant has properly supported the motion with sufficient evidence. *Adickes*, 398 U.S. at 160. The moving party must demonstrate that the facts underlying all the relevant legal questions raised by the pleadings or otherwise are not in dispute, or else summary judgment will be denied notwithstanding that the non-moving party has introduced no evidence whatsoever. *Brunswick Corp. v. Vineberg*, 370 F.2d 605, 611-12 (5th Cir. 1967). The Court must resolve all ambiguities and draw all justifiable inferences in favor of the non-moving party. *Liberty Lobby, Inc.*, 477 U.S. at 255.

## **Analysis**

### **A. Preemption**

The Supremacy Clause of the United States Constitution provides that the laws of the United States “shall be the supreme Law of the Land; . . . any Thing in the Constitution or Laws of any state to the Contrary notwithstanding.” U.S. Const. art VI, § 2. Consistent with this command, the Supreme Court has “long recognized that state laws that conflict with federal law are ‘without effect.’” *Altria Group v. Good*, 129 S.Ct. 538, 543 (2008) (citing *Maryland v. Louisiana*, 415 U.S. 725, 726 (1981)). Congressional intent governs this Court’s determination of whether the OSH Act and the regulations promulgated

thereunder preempt the Crane Ordinance. *See id.*; *Gade v. Nat'l Solid Waste Mgmt. Assoc.*, 505 U.S. 88, 96 (1992) (interpreting the preemptive effect of OSHA). Congress' preemptive intent may be indicated by the OSH Act's express language, or "inferred if the scope of the statute indicates that Congress intended federal law to occupy the legislative field, or if there is an actual conflict between state and federal law." *Altria*, 129 S.Ct. At 543.

In the case, *Gade v. National Solid Waste Management Association*, the Supreme Court considered the preemptive scope of the OSH Act and held that "nonapproved state regulation of occupational safety and health issues for which a federal standard is in effect is impliedly preempted as in conflict with the full purposes of and objectives of the OSH Act." 505 U.S. at 98-99. The Supreme Court reached this holding by inferring Congress' intent to preempt state law through its enactment of § 18(b) of the OSH Act (codified at 29 U.S.C. § 667(b)), which provides that a state "shall" submit a plan to OSHA if it wishes to "assume responsibility" for "development and enforcement . . . of occupational safety or health issue with respect to which a Federal standard has been promulgated." *Id.* at 99. Conversely, § 18(a) of the OSH Act saves from preemption any state law regulating an occupational safety and health issue with respect to which no federal standard is in effect. 29 U.S.C. § 667(a). Thus, the preemption analysis for this Court is (a) whether the Crane Ordinance is an occupational safety and health regulation and, if yes, then (b) whether it is preempted under § 18(b) because there is already a federal standard governing the same issue

or, alternatively, whether the Crane Ordinance falls within the savings clause of § 18(a).

**(i) The Crane Ordinance is an occupational safety and health regulation.**

An “occupational safety and health standard” is “a standard which requires conditions, or the adoption or use of one or more practices, means, methods, operations, or processes, employment.” 29 U.S.C. § 652(8). The Supreme Court made it clear in *Gade* that a state regulated standard will not be saved from preemption simply because it serves a dual purpose, such as addressing public safety *and* occupational safety concerns. 505 U.S. at 104-05. In other words, a dual impact law - that which addresses public safety as well as occupational safety concerns - that serves regulates an occupational safety or health issue for which a federal standard is in effect is impliedly preempted as in conflict with the full purposes of and objectives of the OSH Act. *Id.* at 108. The Court finds that the Crane Ordinance is such a dual impact law.

The County argues that the intent of the Crane Ordinance, “articulated in the whereas clauses, reveal[s] the County’s concern with the area’s construction boom, the number of cranes, hurricanes of increasing frequency and ferocity and the need to protect the public safety.” (County’s Response to Plaintiffs’ Motion for Emergency Preliminary Injunction (D.E. 11, “County’s Resp. to Prelim. Injunc.”) at 11.) More specifically, the Crane Ordinance’s hurricane wind load standard is “meant to prevent the catastrophic collapse of a tower crane and hoisting equipment during hurricanes.” (County’s Cross-Mot. for

SJ at 3.) Thus, the County argues that the Crane Ordinance is directed at *public* safety, not worker safety because “[f]alling cranes kill people, workers and non workers alike” and because workers should not even be at the job site during hurricanes and other high wind events. (*Id.*; see also County’s Resp. to Prelim. Injunc. At 11.) In other words, the County’s position is that the Crane Ordinance (and specifically the hurricane wind load standard) has a singular purpose: to protect the general public, not workers on a construction site.

The Court is not persuaded by this argument. The Court first notes that although the Crane Ordinance’s professed purpose is to protect the public from cranes collapsing during hurricanes, the fourteen construction fatalities referenced in the Ordinance’s “Whereas Clause” occurred between January 2006 and May 2006. South Florida does not experience hurricanes during these months. Moreover, the County has never identified a single crane incident resulting in an injury to a member of the general public (as opposed to a construction worker) that occurred during the hurricane months. Thus, the Court finds the County’s argument that the hurricane wind load standard is aimed solely at protecting the public and to “prevent the catastrophic collapse of a tower crane and hoisting equipment during the hurricanes” seems to the Court to be disingenuous.

Further, this Court is not bound by the purpose of the Crane Ordinance as articulated in its “Whereas Clause”, but “will determine for itself the *practical impact* of the law.” *Hughes v. Oklahoma*, 441 U.S. 322, 336 (1979) (emphasis added) (cited in *Gade*, 505 U.S. at

106); *see also Gade*, 505 U.S. at 105 (“[W]e have refused to rely solely on the legislature’s professed purpose and have looked as well to the effects of the law.”) The practical impact of the Crane Ordinance is directly and most immediately felt by those who are in the business of operating cranes and hoisting equipment because the Ordinance regulates, *inter alia*, the crane and hoisting equipment installed on construction sites, the manner in which that equipment is used, when and by whom the sites and equipment are inspected, and the qualifications/certifications required for crane operators. The fact that the Crane Ordinance is “necessary and desirable for the protection of the public health and safety” does not diminish the fact that the Crane Ordinance is regulating the operation of hoisting equipment and, therefore, worker safety.<sup>11</sup>

The County argues that, at the very least, the Crane Ordinance’s hurricane wind load standard should survive this Court’s preemption analysis as a non-

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<sup>11</sup> The Court also disagrees with the County’s argument that the substantive provisions of the Crane Ordinance are akin to building code regulation because they concern structural requirements and, therefore, should not be deemed preempted as construction activities are traditionally governed by state law. (County’s Resp. to Prelim Injunc. Mot. at 11-12.) First, this argument wholly ignores Section 8E-9 of the Crane Ordinance, which creates tower crane and mobile crane operator qualifications and certifications. This section is clearly regulating workers and not structures. Second, the standards set forth in Sections 8E-4 through 8E-6 expressly apply to the installation *and use* of cranes and hoisting equipment. In other words, these standards are regulating how workers may use the equipment in the course of their employment. As such, the Court finds that the Crane Ordinance is an occupational health and safety regulation.

occupational safety standard because there should not be any workers on a construction site during a hurricane. (County's Cross-Mot. for SJ at 5.) This factual argument, however, does not alter the Court's conclusion that the hurricane wind load standard is in effect an occupational safety and health standard. First, the Crane Ordinance's hurricane wind load standard serves to protect the workers' safety regardless of whether there are hurricane-force winds or not. (An ordinance that protects workers during 140 mph winds also protects workers during 70 mph winds.) Second, workers must comply with the hurricane wind load standard whenever installing or using a crane or other hoisting equipment (*see, e.g.*, Crane Ord. Sec. 1, § 8E-4 ("The following standards shall be applicable to tower cranes proposed to be *installed* and *used* within the . . . County"), and the standard applies regardless of whether the manufacturer's wind load standard is less stringent. In this way, the hurricane wind load standard is different from the Crane Ordinance's hurricane preparedness provision, which solely ensures that the appropriate precautions are taken to secure the work site during a hurricane for the benefit of the surrounding public. (*See* Crane Ordinance Sec. 8E-11.)

The Court is further convinced that the standards contained in the Crane Ordinance are occupational safety and health standards because they do not apply to workers solely as members of the general public. In *Gade*, the Supreme Court held that there are some state laws of "general applicability (such as laws regarding traffic safety or fire safety) . . . that may have a 'direct and substantial' effect on worker safety, [but] they cannot be fairly characterized as

‘occupational’ standards because they regulate workers simply as members of the general public.” *Id.* at 107. Accordingly, such laws of general applicability would not be preempted under the OSH Act. Here, by contrast, the Crane Ordinance sets forth standards that specifically regulate only those in the construction business operating cranes and other hoisting equipment. Additionally, the Ordinance sets standards for construction sites – areas that generally are not open to the public. (See Crane Ord. Sec.1, §§ 8E-4, 8E-5, 8E-6.) Thus, the Court finds that the Crane Ordinance is not a law of general applicability, but rather a local that regulates both occupational safety and health standards for those in the business of operating cranes and hoisting equipment and public safety generally.

In sum, the Court finds that the Crane Ordinance regulates workers, for their own safety and the public’s safety alike. “That such a law may also have a nonoccupational impact does not render it any less of an occupational standard for purposes of pre-emption analysis.” *Gade*, 505 U.S. at 107. Thus, the Crane Ordinance is a dual purpose law that, for reasons stated more fully below, the Court finds is preempted by the OSH Act.

**(ii) There is an applicable federal standard.**

The Court now turns to the second part of the inquiry: Whether the Crane Ordinance is preempted under § 18(b) of the OSH Act because it is a non-approved occupational standard and there is currently a federal standard in effect. The Court begins by noting that it is clear that the OSH Act regulates cranes and



hoisting equipment. *See generally*, 29 C.F.R §§1926.550 & 1926.552. It is also clear that the parties do not dispute the fact that the County did not submit a plan or receive approval from OSHA to enact the Crane Ordinance. (Pl's SOF ¶¶ 4-5; County's SOF ¶¶ 4-5.) The County argues, however, that there are no federal wind load standards for tower cranes. (*See* County's Resp. to Prelim. Inj. at 13; County's Cross-Mot. for SJ at 5.)

As stated above, the relevant OSHA regulation for cranes requires all employers to “comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks.”<sup>12</sup> 29 C.F.R. § 1926.550. In the event that a manufacturer's specifications are unavailable, OSHA requires that the crane be used in accordance with the limitations assigned to the equipment by a qualified engineer competent in the field. *Id.* Meanwhile, the Crane Ordinance requires tower cranes - regardless of the manufacturer's specifications - to comply with the wind load standards in SEI/ACSE 7, or SEI/ACSE 7 in conjunction with SEI/ASCE 37-02. (Crane Ord. Sec. 1, §§ 8E-5 & 8E-6.)

The County argues that “[t]o conclude that the manufacturer's specifications or engineers determine the wind load ‘standard’ for tower cranes is to conclude that there is no ‘standard’ . . . [because] OSHA provides no uniform authority or approved model regarding tower crane wind loads.” (County's Cross-Mot. for SJ at 8.) The County fails to cite, however, a single case

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<sup>12</sup> This same requirement is imposed on employers operating hoists and elevators. *See* 29 C.F.R. § 1926.552.

standing for the proposition that a federal standard must consist of a “uniform authority or approved model,” and the Court refuses to create such a requirement. A plain reading of 29 C.F.R. § 1926.550 is that the federal “standard” is that employers must comply with the manufacturer’s specifications or the limitations set forth by an expert in the field if there are none. The simple fact that OSHA can enforce 29 C.F.R. § 1926.550 shows that a standard exists.<sup>13</sup>

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<sup>13</sup> Because the Court does not interpret the OSH Act or *Gade* to require a “uniform” federal standard in order to find preemption, the Court is not persuaded by the County’s proffer of Mr. Iglesias’s sworn testimony that reliance on manufacturer’s specifications to determine wind load standards for tower cranes provides no uniformity because the DIN standard is not the only wind load standard. (County’s Cross-Mot. for SJ at 8.) Similarly, the Court is not persuaded by County’s reference to the testimony of expert witness, Lawrence Ken Shapiro, who stated during the preliminary injunction hearing that “[t]here’s no *explicit* federal wind load standard that I am aware of.” (County’s Cross-Mot. for SJ at 5 (emphasis added).) Mr. Shapiro did not state that there was no standard, only that it was not explicit. In other words, the federal standard *is* that employers must comply with the manufacturer’s specifications or expert’s recommendation. The federal standard does not need to be as explicit as the wind load standards contained in the Crane Ordinance in order to exist.

Further, the County’s reference to Mr. Iglesias’s testimony that reliance on manufacturer’s specifications may be insufficient to determine a crane’s structural sufficiency is irrelevant to whether there is a federal standard in place. In fact, such testimony only supports the Court’s reading of the OSHA regulation as creating a federal standard. If no such standard existed, then there would be nothing for Mr. Iglesias to evaluate and find insufficient.

In its Cross-Motion for Summary Judgment, the County makes much of the fact that Plaintiff submitted an affidavit from Mr. Adam Cote, which stated that “[a]ll manufacturer specifications for tower cranes used in the United States require the crane to comply with the DIN or the European Standard for wind loads.” (Pl.’s Preliminary Inj. Hr’g, Ex. 17.)<sup>14</sup> The County argues that this assertion is wrong because Mr. Cote has since stated in a deposition that he does not know “for an absolute fact” that all tower cranes in the United States utilize the DIN standard. (County’s Cross-Mot. at 6.)<sup>15</sup> Additionally, the County proffers the declaration of Mr. Peter Iglesias, which states that he has knowledge of many different crane manufacturers that adhere to different standards other than the DIN standard, to support its argument that there is no federal standard. (*See* Iglesias Dec. ¶ 8 (D.E. 57-2).) The Court, however, finds the fact that manufacturers may utilize different wind load standards irrelevant. Regardless of the number of standards utilized by manufacturers, there remains a single standard for OSHA compliance: 29 C.F.R. § 1926.550, which in turn incorporates manufacturer specifications and expert limitations.

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<sup>14</sup> “DIN” is an acronym for Deutsche Industrie Norm, German Industrial Standard. These standard requires cranes to comply with a wind load of 93 mph. (Cote Affidavit, ¶ 8.)

<sup>15</sup> Indeed, Mr. Cote’s deposition testimony was that all the manufacturer’s specifications that he has seen utilize the DIN standard. (Deposition Tr. Adam Cote (D.E. 57-3) 24:12-19, July 9, 2008).

The County is seeking to supplement OSHA regulations by enforcing its own wind load standard, and, as *Gade* makes clear, Congress intended to avoid subjecting workers and employers to duplicative regulation when enacting the OSH Act. *Gade*, 505 U.S. at 100. If the Court were to allow the Crane Ordinance to stand in its entirety, then it would subject employers to duplicative regulation because, for instance, they would have to comply with 29 C.F.R. § 1926.550 *and* the Ordinance's wind load provisions. Therefore, while the Court can appreciate the County's desire to tailor code provisions pertaining to the installation and operation of cranes to better suit the particular climate concerns of South Florida, the County may not supplement or replace 29 C.F.R. § 1926.550 without first obtaining prior approval of the Secretary of Labor, as described in § 18(b) of the OSH Act. *Id.* (“[A] State may develop an occupational safety and health program tailored to its own needs, but only if it is willing to completely displace the applicable federal regulations.”)

## **B. Unlawful Delegation**

The County argues that the federal occupational safety and health standards prescribed in 29 C.F.R. §§ 1926.550 and 1926.552 constitute an unlawful delegation of legislative power to an interested private party. (County's Cross-Mot. for SJ at 8-9.)<sup>16</sup> As the

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<sup>16</sup> The County also made this argument at the preliminary injunction hearing, citing *Carter v. Carter Coal Co.*, 298 U.S. 238 (1936) and *Sunshine Anthracite Coal Co. v. Adkins*, 310 U.S. 381 (1940), two United States Supreme Court cases involving question of whether the provisions of the Bituminous Coal Conservation Act

County recognizes, at least one court has considered whether 29 C.F.R. § 1926.550(a)(1) (the “Crane Load Limit Regulation”) illegally delegates the duty to set standards to private parties. In *Towne Constructions Co. v. Occupational Safety & Health Review Commission*, the Sixth Circuit rejected an employer’s argument that the Crane Load Limit Regulation was an unlawful delegation of OSHA’s rule-making authority. 847 F.2d 1187 (6th Cir. 1988). The court found, among other things, that the requirement that employers comply with manufacturer’s load limits is not an unlawful delegation because manufacturer’s limits reflect the “national consensus standard” that Congress authorized the Secretary to adopt under 29 U.S.C. § 655(a).<sup>17</sup> *Id.* at 1189.

This Court is similarly unpersuaded that the Crane Load Limit Regulation is an unlawful delegation. OSHA prescribes an occupational safety and health

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of 1935 and the Bituminous Coal of 1937, respectively, were unconstitutional as unlawful delegations of legislative power. The Court addressed these two decisions at length in its Preliminary Injunction Order and incorporates the conclusions of law contained therein into its present Order.

<sup>17</sup> Section 655(a) provides in pertinent part:

Without regard to chapter 5 of Title 5 or to the other subsections of this section, the Secretary shall . . . by rule promulgate as an occupational safety or health standard any national consensus standard, and any established Federal standard, unless he determines that the promulgation of such a standard would not result in improved safety or health for specifically designated employees.

29 U.S.C. § 655(a).

standard that mandates compliance with manufacturer specifications; manufacturers have not been entrusted with any law-making authority. Adopting manufacturer specifications indicates a reliance on private expertise but does not amount to actual privatization of the lawmaking function. *Royal Ins. Co. v. RU-VAL Elec. Corp.*, 918 F.Supp. 647, 654 (E.D.N.Y. 1996) (finding that city did not unconstitutionally delegate its legislative power by incorporating private standards into a municipal ordinance); *see also Associated Homebuilders & Contractors v. Brock*, 862 F.2d 63 (3d Cir. 1988) (rejecting petitioner's unlawful delegation argument where the court previously found that OSHA need not itself evaluate the specific hazards of certain chemicals but could rely on the information developed by chemical manufacturers). As the Sixth Circuit in *Towne* stated:

The physical impossibility of requiring OSHA [to] independently to set safety standards for every industry job classification and industrial substance in the country adequately explains and justifies Congress' decision to allow the Secretary to adopt the fruits of private efforts as governmental standards. The particular standards involved here are substantively fair; nor do they benefit the groups that created the standards at the expense of the petitioner. We find no conflict of interest or anticompetitive aspect to this delegation. There is no constitutional violation.

847 F.2d at 1190. Like the Sixth Circuit, this Court finds nothing in the instant record to show that incorporating manufacturer specifications is

substantively unfair, or that it benefits a particular group at the expense of the employer, or that it creates any conflict of interest or anticompetitive effect. The Court is also unpersuaded that reference to manufacturer specifications is a delegation of law-making authority to the crane manufacturing and hoisting industry. Accordingly, the Court finds that OSHA regulations 29 C.F.R §§1926.550 & 1926.552 are valid and constitutional.

### **C. Severability**

The Court found in its Preliminary Injunction Order that, under Florida law, the nonpreempted provisions of the Crane Ordinance may be saved.<sup>18</sup> As neither party appears to dispute this conclusion of law, the Court summarily restates its previous holding that the nonpreempted provisions of the Crane Ordinance are as follows:

(1) The Crane Ordinance’s “Whereas Clauses”;

(2) Section 1, § 8E-1(b)-(h);<sup>19</sup>

(3) Section 1, § 8E-2, except that the following language, contained in the first sentence, is stricken: “This chapter shall provide a uniform standard for the construction, installation, operation and use of Hoisting

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<sup>18</sup> The Crane Ordinance contains a severability provision. (*See* Crane Ord. Sec. 3.)

<sup>19</sup> The Court notes that its Preliminary Injunction Order stated “Section 1, § 8E-1(b)- (n).” However, this was a clerical error, as Section 1 § 8E-1 contains only subsections (a) through (h).

Equipment, for the inspection and certification of Hoisting Equipment, and for the education and certification of Hoisting Equipment operators.”

(4) Section 1, § 8E-7;

(5) Section 1, § 8E-10(a);

(6) Section 1, § 8E-11;

(7) Section 1, § 8E-12;

(8) Section 2, § 8CC-10, except that the following language is stricken: “Failure to maintain or operate crane or heavy equipment in a safe condition in accordance with applicable standards.”

(9) Section 3;

(10) Section 4; and

(11) The first sentence of Section 5, reading: “This ordinance shall become effective ten (10) days after the date of enactment unless vetoed by the Mayor, and if vetoed, shall become effective only upon override by this Board.” The remaining language in Section 5 is stricken.

### **Conclusion**

For the foregoing reasons, it is hereby

ORDERED AND ADJUDGED that Plaintiffs’ Motion for Summary Judgment (D.E. 43) is GRANTED. It is further,



App. 441

ORDERED AND ADJUDGED that Defendant's Cross-Motion for Summary Judgment (D.E. 55) is DENIED. It is further,

ORDERED AND ADJUDGED that Defendant's Request for Oral Argument (D.E. 58) is DENIED AS MOOT. It is further,

DONE AND ORDERED in Chambers at Miami, Florida, this 14th day of January, 2009.

/s/ \_\_\_\_\_  
URSULA UNGARO  
UNITED STATES DISTRICT JUDGE

copies provided:  
Counsel of Record